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Relapse and Recovery in Drug Abuse

Editors:
Frank M. Tims, Ph.D.
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Division of Clinical Research
National Institute on Drug Abuse

NIDA Research Monograph 72
1986

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Alcohol, Drug Abuse, and Mental Health Administration
National Institute on Drug Abuse
5600 Fishers Lane
Rockville, Maryland 20857

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

NIDA Research Monographs are prepared by the research divisions of the National Institute on Drug Abuse and published by its Office of Science. The primary objective of the series is to provide critical reviews of research problem areas and techniques, the content of state-of-the-art conferences, and integrative research reviews. Its dual publication emphasis is rapid and targeted dissemination to the scientific and professional community.

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Relapse and Recovery in Drug Abuse

This monograph is based upon papers and discussion from the RAUS Review Conference on Relapse and Recovery in Drug Abuse which took place on September 19 and 20, 1985, in Rockville, Maryland. The review was sponsored by the Office of Science and the Division of Clinical Research, National Institute on Drug Abuse.

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DHHS Publication Number (ADM)88-1473
Alcohol, Drug Abuse, and Mental Health Administration
Printed 1986 Reprinted 1988

NIDA Research Monographs are indexed in the Index Medicus. They are selectively included in the coverage of American Statistics Index, BioSciences Information Service, Chemical Abstracts, Current Contents, Psychological Abstracts, and Psychopharmacology Abstracts.

Preface

The Research Analysis and Utilization System (RAUS) is designed to serve four functions:

- Collect and systematically classify the findings of all intramural and extramural research supported by the National Institute on Drug Abuse (NIDA);
- Evaluate the findings in selected areas of particular interest and formulate a state-of-the-art review by a panel of scientific peers;
- Disseminate findings to researchers in the field and to administrators, planners, instructors, and other interested persons;
- Provide a feedback mechanism to NIDA staff and planners so that the administration and monitoring of the NIDA research program reflect the very latest knowledge gleaned from research in the field.

Since there is a limit to the number of research findings that can be intensively reviewed annually, four subject areas are chosen each year to undergo a thorough examination. Distinguished scientists in the selected field are provided with copies of reports from NIDA-funded research and invited to add any information derived from the literature and from their own research in order to formulate a comprehensive view of the field. Each reviewer is charged with writing a state-of-the-art paper in his or her particular subject area. These papers, together with a summary of the discussions and recommendations which take place at the review meeting, make up a RAUS Review Report in the NIDA Research Monograph Series.

Relapse and recovery are two related areas which are central to drug abuse treatment and research. This view of drug addiction and dependence as chronic, relapsing disease is supported by both research and clinical experience. Recent research shows that many drug abusers have relatively short "addiction careers" and suggests that with a better understanding of relapse (and its prevention), we may be able to assist clients more effectively in reaching a state of recovery.

The meeting on which this monograph is based took place September 19-20, 1985, at the National Institute on Drug Abuse. Its focus was on: (1) a review of available theoretical perspectives; (2) reviews of long-term studies of treated samples to assess patterns of relapse and recovery over protracted time spans; (3) understanding relapse and recovery through examination of controlled studies and shorter term followup research; and (4) implications of research for clinical practice. The meeting was jointly chaired by Frank M. Tims, Ph.D., and Carl G. Leukefeld, D.S.W. Ms. Jacqueline P. Ludford, Chief, Research Analysis Branch, Office of Science, is coordinator of NIDA's RAUS system.

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Relapse and Recovery in Drug Abuse: An Introduction

Frank M. Tims and Carl G. Leukefeld

From the treatment perspective, relapse and recovery are key issues. The high rate of relapse is an especially frustrating problem, and the notion of a "cure" remains elusive. Substance abuse careers are episodic, with periods of abstinence, reduction of use, and relapse the prevailing pattern, often with the course of events being influenced by external factors such as availability of drugs and societal pressures. Given the patterns of relapse and remission, a variety of interpretations of the nature of substance abuse as a disease condition, how it should be treated, and what the goals of treatment should be, have evolved.

High relapse rates among substance abusers remain old news. Numerous studies have documented that high relapse rates prevail across classes of substances--for example, Marlatt (1979) has found that the average time from abstinence to relapse varies from 4 to 32 days for tobacco, alcohol, and opiates. But there are a host of questions which should be addressed in attempts to understand relapse, as well as recovery. Prominent among these questions is one of definition. What constitutes relapse in treatment populations where a variety of post-treatment substance use patterns may be observed? If treatment is for a particular substance abuse problem, how are we to consider such issues as controlled or occasional use, substitution, and continuation of use of another, perhaps lesser, substance which may constitute abuse? A common solution to this dilemma of classifying relapse to a specific substance is to apply a criterion of loss of control or return to some level of use (For example, see Hall, this volume). There is also a problem presented by the complexity of substance use patterns, as seen in the contrast between polydrug abusers and opiate addicts. As Hubbard and Marsden (this volume) point out, multiple drug use among clients being admitted to treatment is common, and use of a given substance in the early posttreatment period is often continuation of the pattern present at termination of treatment. It appears that some subgroups maintain positive treatment outcomes and have lower relapse rates, although these groups need sharper definition and elaboration. Also, there is a need to better understand how treatment brings about desired behavioral changes, and how these changes can be maintained for specific client types.

Like relapse, recovery is an area where knowledge is lacking. While relapse is observable almost immediately, recovery is a complex, long-term phenomenon. There are criterion problems. At what point is recovery achieved, or, stated differently, is recovery a continuing process over a lifetime of high risk? Research using data from the Drug Abuse Reporting Program (DARP) has noted that while a large percentage of opiate addicts eventually cease use after treatment, marijuana use appears to be a lasting pattern among many clients otherwise drug abstinent (Simpson and Sells 1982). Duckitt and others (1985) have also raised the question regarding relapse after treatment for alcoholics. Clinicians recognize that "slips" or occasional lapses may occur without return to regular use, and researchers have noted that ex-addicts may occasionally use opiates without returning to regular use (Waldorf 1983). Understanding the recovery process is not easy since this is an area of incremental knowledge growth, and the study of long-term careers is essential for this development. Nevertheless, there are some favorable indications in the area of opioid addiction. Simpson and others (1982) found that an increasing percentage of opioid addicts reach and maintain abstinence over a 6-year period, with more than half this sample opioid abstinent at 6 years. Moreover, findings from another sample of opioid addicts in the DARP treatment population revealed reasonably stable outcomes over a much longer period (Joe et al. 1984). These DARP outcome studies are a sharp contrast to those of treatment samples from the 1950s.

In attempts to better understand relapse and recovery, numerous theoretical formulations have been advanced, often with limited data. Better integration of theory and empirical findings, organized to build on promising treatment approaches, could make a major contribution. This would serve to: (1) clarify existing theory and assess the relative utility of those theories to better explain relapse and recovery; (2) critically examine recent long-term studies of substance abuse clients, with a view to identifying differential outcome patterns and predictors; (3) review more short-term, controlled studies which have the potential for increased understanding of relapse and recovery; and (4) consider the implications of theory and research findings for clinical practice. Thus, the structure and outline of this volume. Because a key question has to do with the extent to which relapse and recovery are generalizable across categories of substances, a major objective here was to include researchers and studies focused on varied addictive or dependency-producing substances--especially opiates, alcohol, and tobacco. In addition, a variety of disciplinary, theoretical, and clinical perspectives are represented.

The first chapters deal with theory from differing perspectives. Dr. Thomas Babor, who led the discussion on theory, presents recent work on the utility of the drug dependence syndrome construct as an organizing principle in clinical research. Dr. Donald Wesson presents a more general review of existing theory in the substance abuse field, and Dr. John Grabowski reviews perspectives from the smoking literature, with particular emphasis on behavioral approaches to explaining dependency, its treatment, and relapse.

A number of longitudinal studies are then examined for insights into relapse and recovery. Dr. James F. Maddux led the discussion in this area, and presents findings from a number of studies across categories of substances. Longitudinal data presentations are also given by Colin Taylor, who discusses a cohort of employed male alcoholics, Dr. D. Dwayne Simpson, who reports long-term findings for opioid addicts treated in community-based programs, and Dr. Timothy Baker, who presents a data on clients treated for tobacco dependency.

The third group of chapters focus on the theme, "understanding relapse and recovery," and are primarily concerned with controlled and interpretive studies of short term treatments. Discussion in this area was led by Dr. Sharon M. Hall, who presents findings on relapse among opiate, alcohol, and tobacco clients treated in short-term programs (under 30 days) and followed weekly thereafter. Dr. William McAuliffe reports findings on relapse among opioid addicts who were discharged as completing treatment and abstinent. Dr. Robert Hubbard provides a useful examination of drug abuse patterns at admission to treatment, and patterns of drug use after treatment, for a large sample of clients, and raises interesting questions as to how to view "relapse" when multiple drug use is the prevailing pattern and when drug substitution (licit or illicit) occurs after treatment. Dr. George Bigelow examines relapse to cigarette smoking (and intervention to prevent relapse) among a sample of patients who suffered myocardial infarction, further exploring the insights which are available to the drug abuse field from studies of relapse to tobacco smoking.

Clinical implications of existing research on relapse and recovery research are addressed in a paper by Dr. Bruce Rounsaville. Finally, a series of recommendations based on the deliberations of the above-mentioned authors and other participants was developed, and is presented in the concluding chapter of this monograph. The meeting was jointly chaired by the authors of this chapter.

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Theories of Relapse and Recovery and Their Implications for Drug Abuse Treatment

Donald R. Wesson, Barbara E. Havassy, and David E. Smith

Psychotherapists, drug abuse counselors, treatment program planners, and researchers have theories about what relapse is, why it occurs, and how it is prevented. Such theories are important because they shape the treatments provided to drug abusers. For example, a therapist who believes that drug abuse is a chronic, relapsing disease will treat a patient who has relapsed differently from one who views drug abuse as a secondary symptom of underlying psychopathology. A clinical researcher who accepts a theory of inherited endorphin deficiency will design and test treatments for relapse differently from a researcher who believes that drug abuse is learned behavior.

In this chapter, we review selected theories of relapse and the antithesis of relapse, recovery. We selected theories that are of current importance: those that form the foundations of currently used treatment modalities, or those that mold common notions about the behavior of drug abusers. We will describe the theory, give examples of research which support the theory, and discuss how the theory influences treatment.

Relapse can be defined as a discrete event, which occurs at the moment a person resumes drug use, or as a process which occurs over time. In the latter view, it may mean resumption of addiction; return to drug use of the same intensity as in the past; daily drug use for a specified number of sequential days (e.g., daily use for 1 week); or a consequence of the drug use, such as the return to the hospital for further drug abuse treatment (e.g., Litman et al. 1983).

The definition of relapse may be shaded by the treatment modality and the goals of treatment. For example, in a methadone maintenance client for whom the only realistic treatment goal is reduction in illicit drug use, relapse generally means resumption of frequent or daily opiate use.

Relapse rates are dependent on: (1) the definition of relapse used, (2) the method of detecting relapse, and (3) the method used to compute them. Given the different meanings of relapse previously stated, it is apparent that large variations in relapse rates could result from the definition of relapse used.

Methods of detecting relapse also vary widely. In drug treatment outcome research, an interview with the subject combined with urine testing to validate current drug use is a common method of assessing relapse. The method is not precise, however, because urine testing analytic methods vary in sensitivity, in specificity, and in the drugs that can be detected. For example, EMIT is extremely sensitive for morphine, marijuana, and benzoylecgonine (a cocaine metabolite) and can detect them in urine for several days following use. Thin-layer chromatography, another commonly used screening method, is less sensitive for these drugs and may miss some drug use which would be detected with EMIT.

Two time frames are in common use in computing relapse rates. One ascertains current drug use at specific time intervals following treatment termination (e.g., 1 year after the end of treatment). This does not capture intermittent drug use unless it is occurring at the time of followup. The other method ascertains whether there was drug use at any time during the followup period. Since drug abusers often have periods of abstinence interspersed with use, the second method will generally produce higher relapse rates (Pickens et al. 1985).

A final variation in computing relapse rates is in the handling of missing data. Since investigators are unable to contact all subjects in followup studies, assumptions must be made about subjects lost to followup. They may be assumed to have relapsed, or they can be "replaced" by subjects who could be located. The method of handling missing data is often not overtly specified in reports of relapse rates; yet, it can account for considerable variance.

GENETIC THEORIES AND RELAPSE

The vulnerabilities to drug dependence that are under genetic control are usually discussed as risk factors in developing drug dependency, but they also have a relationship to relapse.

Adoption, twin, and animal studies provide evidence of important genetic factors in alcoholism. The risk of developing alcoholism is closely associated with the degree of genetic relationship to an alcoholic parent. Offspring of alcoholic parents have an increased risk of developing alcoholism, a relationship which holds even when the children are raised separately from each other and from the biological parents (Schuckit et al. 1985).

The theory postulates a genetically transmitted biochemical abnormality that predisposes some individuals to abuse of a drug if they use it. The abnormality has not yet been identified; however, examples of altered metabolism of alcohol in young men with a family history of alcoholism (who are assumed to be at higher risk of developing alcoholism should they use alcohol) have been described (Schuckit and Duby 1982). Their subjects had more facial flushing in response to alcohol than controls without a family history of alcoholism. The flushing in response to alcohol ingestion is similar, but less intense, to that which occurs in some Orientals, North American Indians, and Eskimos. It is the result of blood acetaldehyde, a metabolite in the breakdown of ethanol. The relationship between this particular finding and alcoholism is not clear as one might logically expect that the flushing, generally perceived as unpleasant, would offer protection from development of alcoholism. The finding of this example of altered metabolism in subgroups of individuals adds weight to the genetic theory. The genetic theory explains why not everyone who drinks heavily develops alcoholism and why people who have the abnormality are more likely to relapse if they depart from abstinence.

A genetic theory has also been proposed for opiate dependence. Goldstein (1978) hypothesized that some individuals might be predisposed to develop narcotic dependency. He hypothesizes that a person could inherit an endorphin deficiency. If people with the deficiency happened to use narcotics, they would discover a "normalizing" or euphorogenic effect in excess of that experienced by people without the abnormality. This effect would predispose them to dependency opiates and make it harder to remain abstinent.

Implications for Treatment

Genetic theory is used to bolster the illness model of drug dependence. Vulnerability on a genetic basis is used as a "nonjudgmental" way of explaining to drug abusers why they cannot return to "controlled" drug use.

METABOLIC THEORIES

In the early 1960s, Dole and Nyswander were studying the metabolic kinetics of morphine when they observed improvement in subjects' functioning in response to substituting methadone for morphine. Long before the discovery of narcotic receptors, endorphins, or enkephalins, Dole and Nyswander postulated that repeated exposure to narcotic drugs might induce metabolic changes in neurons (Dole and Nyswander 1967, p. 22). Methadone corrected the metabolic change. Since methadone was meeting a metabolic need of the patient, replacement methadone therapy, perhaps lifelong, was rational and the treatment fit a medical model (i.e., like exogenous insulin for a diabetic).

The hypothesis that exposure to narcotics produces metabolic alterations is supported by more recent work with opiate receptors, beta-endorphin, and enkephalins. After the discovery by Goldstein in 1971 that some neurons had specialized recognition sites on the cell's membrane for opiates, scientists searched for an endogenous substance with opioid activity that would bind to the receptor. Several endogenous substances meeting the criteria were subsequently found: beta-endorphin, a fragment of beta-lipotropin; and two pentapeptides, methionine-enkephalin and leucine-enkephalin. Goldstein (1978) speculated that a relationship existed between beta-endorphin levels and heroin addiction. He hypothesized that the use of heroin would suppress endorphin production, analogous to feedback regulation of other hormones. Further, persistent opiate withdrawal symptoms would result from endorphin deficiency, and protracted narcotic withdrawal symptoms could help account for the high relapse rate among opiate addicts.

Ho et al. (1980) provide empirical support for Goldstein's hypothesis that beta-endorphin levels are abnormal in opiate addicts. They compared plasma levels of endorphins in heroin addicts and nondrug-using controls and found that the mean level of immunoassayable plasma endorphin activity, which reacts with beta-endorphin and beta-lipotropin, was reduced in the heroin addicts to about one-third the level of the nonaddict controls.

Implications for Treatment

The metabolic theory of opiate dependence supplies support for opiate dependency as a disease. Reduced endorphin levels of narcotic addicts provide plausible medical reason for a relapse. Metabolic theories bolster the medical disease model of narcotic drug abuse and provide a medical foundation for narcotic maintenance therapy (e.g., methadone and LAAM). The endorphin deficiency model also has an implication about the duration of methadone treatment. If one supposes that the addict inherited an endorphin deficiency, analogous to insulin deficiency in diabetics, then "replacement" could be lifelong. Many providers of methadone maintenance do not use this model. They view the need for methadone maintenance to be temporary and the appropriate use of methadone to be to provide a time-limited period of psychosocial stabilization while rehabilitation occurs. Widespread acceptance of this latter perspective has led to legislation that prohibits maintenance therapy of unlimited duration. Typically, in the United States, opiate addicts are provided methadone maintenance for periods of 1 or 2 years.

LEARNING THEORIES

Learning theories have been developed to explain initiation of drug use, habituation, withdrawal, and relapse. We will restrict our discussion to the learning theories most relevant to relapse: (a) conditioning theory, and (b) social learning theories.

CONDITIONING THEORY

Wikler (1961, 1965, 1973) proposed the conditioned withdrawal syndrome to explain why formerly addicted persons who appear to be "cured" of their addiction while in treatment or in jail return to opiate use when no longer physically dependent. According to Wikler, environmental and social stimuli formerly associated with actual withdrawal and drug-seeking became classically conditioned stimuli for a conditioned withdrawal syndrome. Wikler and Pescor (1967) demonstrated a conditioned withdrawal syndrome in rats. Rats that were no longer morphine dependent showed signs of narcotic withdrawal (e.g., "wet shakes") when they were returned to the cage in which they had previously suffered narcotic withdrawal.

With Ludwig, Wikler extended the conditioned withdrawal model to alcohol relapse (Ludwig and Wikler 1974). Over time, craving and other alcohol withdrawal phenomena become conditioned to environmental and emotional stimuli through temporal continuity. Once conditioned, exposure to the same or similar stimuli would cause an abstinent alcoholic to experience withdrawal.

Some evidence of conditioned abstinence in intravenous heroin addicts was found by Sideroff and Jarvik (1980). Eight addicts who were completing a 14-day detoxification program were shown a 6-minute videotape depicting scenes of heroin being prepared for injection and being injected. Compared to a control group of two heroin users who snorted heroin and six patients who were not drug dependent, the intravenous heroin users, while watching the videotape, developed greater increases in anxiety, depression, drug cravings, galvanic skin resistance, and heart rate. These investigators propose that the psychological and physiological changes they observed demonstrated conditioned withdrawal.

Implications for Treatment

A direct application of classical conditioning is aversion treatment of alcoholism with emetine. Patients have sessions in which they are given emetine, which produces severe nausea and sometimes vomiting, while being allowed to smell or taste their preferred alcoholic beverage. With repeated pairings of alcohol with nausea, instead of the usual pleasurable feelings, alcohol loses its appeal.

To prevent relapse to narcotic use, Wikler (1980) proposed active extinction of the classically conditioned abstinence syndrome and the operantly conditioned drug-seeking behavior by eliciting the abstinence syndrome while preventing the reinforcing effects of opiates. He predicted that repeated elicitation of the conditioned withdrawal syndrome while the reinforcer (i.e., the relief obtained from the narcotic) is blocked with an orally effective, long-acting narcotic antagonist (such as naltrexone) should eventually extinguish the conditioned withdrawal syndrome, and the drive for self-administration of narcotics should cease.

SOCIAL LEARNING THEORIES

Social learning models of addiction and relapse acknowledge the role of classical and operant conditioning; however, they focus on cognitive-mediated processes in the acquisition, maintenance, and modification of behavior. The various social learning theories complement conditioning theory by focusing on the cognitive processes occurring between stimulus and behavior.

A general model of relapse in a social learning framework has three components: first, the patient encounters a high-risk situation during abstinence; second, the patient has expectations about whether the situation can be handled without use of drugs; and third, the patient has a limited repertoire of behaviors and skills to cope with the high-risk situation.

What follows the high-risk situation depends on whether the situation resulted in drug use. The model holds that avoiding use leads to heightened expectations about personal control, mastery, and continued abstinence. Using a drug in response to the high-risk situation can lead to feelings of failure and guilt, which can precipitate further use.

Consequences of relapse have been discussed by Bandura (1978) and Marlatt and Gordon (1980). "Catastrophizing" (Bandura 1978) is an exaggerated or extreme response to an occasion of use. Persons who doubt their ability to control their use, e.g., those with low efficacy expectations, are likely to overreact or "catastrophize" the consequences of a single lapse and view the lapse as a global failure. The Marlatt and Gordon (1980) abstinence violation effect (AVE) is a similar construct. It has two components: cognitive dissonance (having a self-image as a nonuser which conflicts with the actual drug-using behavior) and personal attribution of the transgression as a sign of weakness and failure. Although the AVE varies in intensity, its occurrence will increase the probability of repeating the drug use since the dissonance and the attribution of weakness will drive behavior to reduce the dissonance.

Implications for Treatment

The work of social learning theorists contains specific formulations regarding relapse prevention. Treatment derived from social learning theories attempts to prevent relapse by intervening at different points in the chain of behaviors, beginning with antecedents to the high-risk situation and extending through actual relapse. The interventions are tailored to the particular stage in the sequence and to the particular person.

Social learning theorists agree that a critical point of intervention is at the time of experiencing a situation of risk. Treatment goals include fostering recognition of the situation as one of risk, maximizing expectations of efficacy in handling the situation, and enhancing the behavioral repertoire to cope with the situation. The person is taught to recognize his or her high-risk situation and to practice coping skills needed to avoid drug use should the situation be encountered.

Following a slip or a relapse, interventions include teaching clients how to limit or contain an episode of drug use and how to apply cognitive restructuring. Cognitive restructuring involves conceptualizing the episode of use as a limited slip rather than a major disaster; analyzing the high-risk situation; and learning new coping skills.

PSYCHOPATHOLOGY AS A CAUSE OF RELAPSE

Many psychodynamically trained practitioners view addiction as a symptom of underlying psychopathology. Their view is based on observations that many drug-dependent persons display a broad range of symptoms and behaviors that match one or more DSM III diagnostic categories (e.g., personality disorders, major affective disorders). Divergent opinions often revolve around whether the psychiatric symptoms are the result or the cause of drug abuse. Many alcoholics, for example, show certain personality characteristics (high extroversion and anxiety) on the Minnesota Multiphasic Personality Inventory (MMPI). The methodological difficulty is to determine whether the personality traits predated, and perhaps contributed to, the development of alcoholism, or whether the personality traits are a product of being alcoholic. The latter interpretation is supported by prospective studies of men who later became alcoholics. The studies found no evidence of childhood psychiatric problems or "neuroticism" when compared to adequate control populations (Schuckit et al. 1985).

Some chemically dependent patients do, however, have severe psychopathology which predates their drug use; and the psychopathology will persist, or become more overt, after sustained abstinence from drugs. Referred to as dual diagnosis (a major psychiatric disorder not caused by drug abuse combined with a substance abuse disorder), such patients are difficult to treat in traditional substance abuse treatment programs and often do not do well with psychotherapy or other modes of psychiatric treatment. Many bounce back and forth between drug treatment programs and mental health clinics or hospitals, generally creating havoc in both.

Implications for Treatment

The theory that all substance abusers have underlying psychopathology has practical ramifications in treatment: many therapists view the drug dependency as a secondary symptom that will disappear when the underlying psychopathology is adequately treated. As a consequence, they choose not to address the drug use. A related position is that the patient is using drugs to self-medicate psychopathology; therefore, the treatment intervention is directed at the underlying pathology. With both of these approaches, abstinence is viewed as evidence that the psychopathology is resolving; relapse means that the psychopathology is not resolved.

An approach that is gaining favor is to treat the addiction as the primary problem and to delay treatment of the overt psychopathology until a period of abstinence has been achieved. Depression or other psychopathology may be secondary to the drug use and may therefore resolve without specific intervention apart from treatment of the chemical dependency, e.g., the acute depression following cocaine use (Gawin and Kleber 1985, Smith and Wesson 1985). Treatment of relapse would directly address the drug use.

THE ROLE OF STRESS AND SOCIAL SUPPORT IN RELAPSE

The notion that stress and social support are related to relapse is embedded in many different relapse theories; therefore, we discuss stress and social support separate from any specific theory of relapse.

STRESS

Reference to the role of stress in contributing to relapse is ubiquitous in the drug abuse literature. Stress, operationalized as negative life events, is implicated in treatment failure (Benfari et al. 1982) or as a cause of relapse (Shiffman 1982; Marlatt and Gordon 1980; Mermelstein et al. 1983a, 1983b; Ogbru 1976). Despite the frequent references to stress as a cause of relapse, mechanisms of this implied relationship are not clear.

The role of stress as one of several contributors to relapse following treatment has been well-articulated by a group of investigators associated with the Social Ecology Laboratory (e.g., Cronkite and Moos 1980; Finney et al. 1980; Moos et al. 1979). Finney et al. (1980) found that a large number of posttreatment negative life events were associated with poorer posttreatment outcome in alcoholics. Moos and Finney (1983) report negative life events more prevalent among relapsed alcoholics than among recovering alcoholics or a matched nonalcoholic community sample (Moos et al. 1981). The number of negative life events at 6 months posttreatment predicted complaints of physical symptoms and depression at 2 years posttreatment even after socioeconomic variables and level of functioning at treatment intake were controlled (Finney et al. 1980).

Cronkite and Moos (1980) found that posttreatment stress affects alcohol treatment outcome, especially level of depression. Among the three posttreatment factors in their path-analysis model, stressors and coping responses were more strongly related to outcome than family environment. More stressors are associated with poorer outcomes. The way in which the data were collected, however, does not make it possible to separate the stressors produced by the relapse (e.g., separation from spouse due to return to drinking) from stressors leading to a relapse (e.g., drinking in response to a separation).

SOCIAL SUPPORT

A dominant hypothesis in the literature is that social support functions as a buffer to stressful life experiences--i.e., the negative consequences of stressful life events--are mitigated by social support. There has been, however, a growing accumulation of challenges to the buffer hypothesis (e.g., Gore 1978; Thoits 1982; Mitchell 1984).

Another hypothesis is that social support has a generally beneficial effect, independent of whether persons have stressful events in their lives, and that those who receive social support have greater well-being. In a recent review, Cohen and Wills (1985) concluded that there is evidence consistent with both models. According to Cohen and Wills, evidence for a buffering effect is found when social support is measured as a resource available in response to particular stressful events. Evidence is found for the generally salubrious effects of support when it is assessed as the extent of a person's integration in a social network. Each represents a different conceptualization and measurement of processes by which social support affects well-being.

Of relevance to drug abuse treatment is how social support functions in relation to relapse. Both of the above models of support may have value in this regard. Other important aspects of the role of support in relapse, though not necessarily mutually exclusive, include the possible negative consequences of social support, the issue of drug-specific versus general social support, and the role of support from family and significant others.

Negative Aspects of Social Support

A common, though not explicit, assumption is that social support is always of positive value. Only a few investigators (e.g., Lehman et al. 1983; Mitchell 1984; Schaefer et al. 1981; Shinn et al. 1983) have examined the quality of social support or acknowledge negative aspects of various forms of social support, i.e., there are sometimes negative consequences to having support. Negative aspects of being involved in supportive relationships include the demands made by others, the constraints they exert over one's choices, the efforts required to sustain the contact, and the disappointment often inherent in relationships when help is needed and expected, but not forthcoming.

The potentially negative aspects of social support are acknowledged in the addictions literature (Tucker 1979; Reed 1985). Social support can either assist in the maintenance of abstinence or foster relapse. Some family interactions that appear to be supportive may, in fact, promote relapse (e.g., Coleman 1980; Stanton et al. 1982; Todd 1984). For example, smoking treatment clients who have spouses who also smoke and who are not in treatment have a lower probability of successfully stopping (Lichtenstein 1982).

Peer groups can also provide social support that can promote relapse. Certainly, friends who are still using drugs are more likely to support relapse than recovery. Empirical evidence that peer pressure can promote relapse is found in the work of Marlatt and Gordon (1980). They report situations in which patients describe that being offered a drug or being around others who are using, even if the drug is not offered, were relapse precipitants for 18% of smokers (n = 35), 25% of alcoholics (n = 70), and 34% of opiate users (n = 32).

Drug-Specific Versus General Social Support

Drug users may receive general social support, but it may not include support for achieving and maintaining abstinence. If network members are unaware of, or not sensitive to, the users' problem, the support they provide may not be a resource to cope with issues concerning maintaining abstinence. Or, if network members also have problems with the drug, the support offered may be in the service of relapse. This consideration of social support, general versus drug-specific, in relation to drug use and relapse is relatively new and has not received sufficient attention.

Mermelstein et al. (1983b) explored partner support specific to smoking cessation treatment. In the last week of treatment, after the target quit date, subjects rated their spouses on the frequency of supportive behaviors related to smoking cessation and how helpful these behaviors were for maintaining abstinence. Subjects were divided into three groups at each followup point: those who never quit, those who quit and relapsed, and those who were abstinent. At all three followup points, there was significant group effect on helpfulness scores: subjects who never quit rated their spouses' behavior significantly less helpful than the subjects who were abstinent or who relapsed. Differences between relapsers and abstainers did not reach significance.

In research concerning commonalities of relapse in three drug groups (smokers, alcoholics, and opiate abusers) (see Hall and Havassy, this volume), the relationship of both general and abstinence-specific social support to posttreatment relapse was assessed (Havassy et al., in press). Subjects provided information about the support from network members for treatment and abstinence. They also completed measures concerning helpfulness of abstinence-specific support from a significant partner (adapted from Mermelstein et al. 1983b), general social support and negative social support. Preliminary findings on the first 77 subjects of a sample of 230 indicate that greater general social support predicted longer periods of abstinence following treatment for all three drug groups. Greater experienced helpfulness of abstinence-specific support from a partner predicted a longer time before relapse, but did not attain a .05 level of significance; greater drug use of network members and their encouragement of drug use predicted shorter periods of abstinence.

In related work, Janis and Hoffman (1970, 1982) experimentally manipulated abstinence-specific support from a treatment partner to maintain abstinence from smoking. In long-term followup interviews conducted 1 and 10 years posttreatment, they found that clients treated in pairs who were in the high-partner contact condition (daily calls for 5 weeks) were more successful in maintaining abstinence than were clients in the low-contact or the control condition. According to Janis (1983), high-contact partnerships meet the following criteria of effective helping relationships: high disclosure of personal information relevant to the problem, e.g., smoking cessation; disclosures accompanied by mutual acceptance; reference to the antismoking norm in the contact; and contact beyond the duration of the formal treatment.

Spouse/Partner and Family Support and Relapse

The support available from spouses, significant others, and families in relapse prevention treatment has been explored with mixed results, i.e., support can have both positive and negative consequences. Studies in which levels of spousal or familial support are investigated occur most notably in the weight-loss treatment (e.g., Brownell et al. 1978; Stuart and Davis 1972; Mahoney and Mahoney 1976) and in the smoking-cessation literature (e.g., Mermelstein et al. 1983b). Mahoney and Mahoney (1976) found family support to be positive; Stuart and Davis (1972) found it detrimental to weight loss. Although there were no differences among the groups in mean weight reduction at the end of treatment in the Brownell et al. (1978) study, at 3 and 6 months posttreatment, subjects whose spouses had been trained with them in behavioral weight-loss techniques lost significantly more weight than subjects whose spouses had not been trained.

Naturally occurring marital and family support and their correlation with posttreatment outcome have been studied by Moos and his colleagues and, more recently, by Havassy et al. Moos and Finney (1983) report results of alcohol treatment studies indicating that marital and familial cohesion correlated with better outcome in several areas, including posttreatment alcohol consumption. Havassy et al. (in press) found subjects (in three drug treatment groups: alcohol, tobacco, and opiates) with partners had significantly longer periods before relapse than those with no partners.

Implications for Treatment

As numerous studies point to the contribution of stress to relapse, therapists should recognize that patients are vulnerable to relapse during times of stress. Teaching techniques for coping with stress is one example of how therapists counter the relapse potential of stressful life events.

Examples of deliberate manipulation of social support to prevent relapse may be seen in such programs as Alcoholics Anonymous (AA), Synanon, Weight Watchers, or drug treatment aftercare programs that emphasize or create a "buddy system" (or sponsor). Treatment programs, especially those for obesity and cigarette smoking, frequently establish overt support conditions to assist clients in withstanding and overcoming stressful situations without relapse.

THEORIES OF RECOVERY

In the context of addictive behavior, the term "recovery" can mean "cure" of addiction, "abstinence" from drug use, or "remission" of the drug-dependent state. Theories about recovery usually describe a process of achieving and maintaining abstinence that is not necessarily related to any specific type of treatment. These theories reflect notions about influences of major life changes in producing and sustaining abstinence.

MATURATION THEORY OF WINICK

Using 1955-60 data from the Federal Bureau of Narcotics registry, Winick (1962) noted that most opiate addicts began use in their late teens and early twenties and disappeared from the narcotics registry after age 35. From this observation, Winick hypothesized that, by age 35, most opiate addicts "mature out" of the problems that originally led to heroin use. After 35 years of age, they find the drive to continue drug use not sufficiently compelling for them to continue the life-style necessary for opiate use.

Subsequent longitudinal studies do not support the maturation hypothesis. For example, Harrington and Cox (1979), in a 20-year followup of 51 heroin addicts, found that only 1 was drug-free after age 40. Likewise, Vaillant (1973), in a 20-year longitudinal study of addicts admitted to the U.S. Public Health Service Hospital in Lexington in 1952, found that only 35% of addicts could be classified as "matured out" by age 40.

NATURAL RECOVERY FROM OPIATE ADDICTION

Waldorf (1983) studied 201 ex-opiate addicts (half were treated, and the other half had quit without treatment). He concluded that the concept of "maturing out," preconditions such as "hitting bottom," and existential crises were not adequate to explain the variety of recovery experiences. The ability to quit was not necessarily related to treatment. Addicts used a variety of methods to obtain and maintain abstinence. Those who were successful generally broke all ties with opiates users and created new interests, new social networks, and new social identities.

TWELVE-STEP RECOVERY MODEL

Members of AA or other 12-step recovery groups use the term recovery to mean more than abstinence from drug and alcohol: being "in recovery" implies that the person has accepted that addiction as a lifelong, incurable disease; that the person is participating in 12-step recovery groups; and that the person is learning to live a comfortable and responsible life without the use of psychoactive drugs. Additionally, a model of recovery evolving from 12-step "recovery" groups views cessation of drug use as an active, continuing process.

Recovery groups accept that once alcohol or drug dependence has developed, the illness will persist throughout the remainder of a person's life. Therefore, maintenance of sobriety requires strict abstinence, aided by continued participation in recovery groups. When 12-step recovery group members speak of the quality of someone's recovery, they mean the number of meetings he is attending, his giving the maintenance of his sobriety the highest priority in his life, his level of comfort in living without drugs or alcohol, and the step he is currently "working." An important method of maintaining sobriety and reinforcing a person's long-term recovery is called "twelve-stepping" or helping others with the problem.

The recovery model stresses abstinence from all mood-altering substances (generally excluding nicotine and caffeine), and any use of drugs or alcohol is called a relapse. Behavior may be labeled as relapse even before return to drug use. In the recovery model, it is stressed that relapse does not happen as a single, isolated event, but is proceeded by a period of altered attitudes and cognitive style. Members of AA refer to this pattern of thinking as "stinking thinking." First, the person begins to view himself or herself as "cured" and no longer in need of attending meetings and being constantly vigilant to prevent relapse. The person reduces or stops attending AA or other 12-step meetings. Next, the person questions the need to maintain abstinence from all psychotropic drugs and eventually tries a drug, not necessarily the primary drug of abuse, "to see" if this leads to a compulsive use of the primary drug of abuse. If it does not, the notion that strict avoidance of all psychoactive drugs is not necessary is confirmed. Lastly, the person "tests" his or her ability to control use of the previously abused drug. If loss of control is not immediate, the notion of the "cure" is reinforced, and the person is further estranged from recovery support peers. Since the recovery model assumes that drug dependency is a lifelong illness, the drug use is viewed as a return of the illness.

Implications for Treatment

Although many forms of treatment include or encourage their patients to participate in AA or other forms of 12-step recovery, the participation is viewed as a treatment adjunct. Twelve-step recovery incorporates many of the change forces described by Waldorf in natural recovery: new social networks, new social identity, and new interests. Many addicts, however, reject 12-step involvement because of the religious overtones. The challenge to substance abuse treatment is finding ways to engage more patients in 12-step recovery and in creating alternatives to harness the potent change forces active within 12-step recovery.

CONCLUSION

There is a great diversity of theory about relapse and recovery. This diversity can be considered from both a treatment and a scientific perspective. From the treatment perspective, the diversity has an important practical consequence: different theoretical positions translate to different treatments and interventions. What happens to someone who relapses depends on the treatment provider's response, and that depends on the theoretical model that influences the provider. In some formulations, most notably social learning theory, a relapse can facilitate learning about high-risk situations. In other models, a relapse may convince people that they are unable to maintain "controlled" drug use. Thus, relapse need not be synonymous with treatment failure.

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ACKNOWLEDGMENTS

This work was supported in part by research grant numbers RO1-DA-O3082 and RO2-DA-03516 from the National Institute on Drug Abuse and number BRSG S07-RRO5755 from the National Institutes of Health.

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The Drug Dependence Syndrome Concept as an Organizing Principle in the Explanation and Prediction of Relapse

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Common sense suggests that addictive behaviors are at once biologically based illnesses, personality-related psychological disorders and socially learned "bad habits." All of these common sense notions have provided a basis for theories of addiction, typically described in the academic literature as the medical, psychological, and social models of substance use, respectively. Depending on the relative emphasis given to disease processes, self-contol, psychological vulnerability, or social learning, common sense theory reflects the implicit assumptions ordinary laymen have about the "problem" of psychoactive substance use.

In this chapter we will consider a theory of dependence that contains elements of all of these common sense notions of addiction; namely, that dependence is a socially learned, biologically based, psychologically mediated condition that impairs an individual's ability to exercise voluntary control over such substances as alcohol, nicotine, and other drugs. In the process of describing and evaluating this drug dependence syndrome (DDS) concept, we will give special emphasis to its implications for the understanding of both relapse to, and recovery from, a variety of addictive disorders.

The term relapse refers to the return to substance use, following a period of voluntary or enforced abstinence, at a level of intensity comparible to that attained before abstinence. Recovery means either the stabilization of abstinence, or the regular consumption of a substance without the negative consequences previously associated with drug use.

THE DRUG DEPENDENCE SYNDROME CONCEPT

The drug dependence syndrome concept was developed (Edwards et al. 1981) within the context of the World Health Organization's ongoing program on nomenclature and classification of alcohol- and drug-related problems. Previous work by a WHO Expert Committee (1964) had recommended abandonment of the concepts of addiction and habituation in favor of drug dependence, which was differentiated into psychic and physical manifestations. Subsequent developments in the classification of alcoholism within International Classification of Disease-9th Edition led to the substitution of the words "alcohol dependence syndrome" for such terms as alcoholism and alcohol addiction. The more generic drug dependence syndrome concept grew out of earlier formulations of alcohol dependence (Edwards et al. 1976; Edwards et al. 1977).

The essential postulates of the syndrome concept of dependence include: 1) the clustering of certain cognitive, behavioral, and physiological elements which are all related to a common psychobiological process; 2) the distribution of these elements along a continuum of severity; 3) recognition of individual differences in the patterning of elements according to such influences as culture and personality; and 4) conceptual as well as statistical independence of dependence and syndrome-related disabilities. Although no assumptions are made with respect to the progressiveness of the syndrome or its irreversibility, there has been some suggestion (Edwards and Gross 1976) that very severe alcohol dependence is not reversible. Tolerance and withdrawal can exist in the absence of the behavioral and cognitive elements. When this occurs, the term "neuroadaptation" is employed to suggest that tolerance and withdrawal are not identical to the broader phenomenon of a psychobiological dependence syndrome. Beyond the biological changes associated with both physical withdrawal and tolerance is the behavioral manifestation of the syndrome "in which the use of a given psychoactive drug, or class of drugs, is given much higher priority than other behaviors that once had higher value" (Edwards et al. 1981).

The drug dependence syndrome (DDS) as a construct is the organizing principle for a general theory of dependence. The core syndrome elements include the cognitive, behavioral, and physiological symptoms summarized in table 1. The broader dependence model, described in detail by Edwards et al. (1981), postulates that the initiation and maintenance of drug-taking behavior is a function of both distal and immediate antecedent variables ranging from genetic to social influences. The general DDS theory maintains that a complete explanation of an individual's substance use must include statements concerning the frequency and severity of dependence, the kinds and degrees of disability, and the personal and environmental influences on substance use. What ties together the elements of the syndrome and helps to account for their interrelationships is an often unstated set of assumptions about the learning processes behind the acquisition and maintenance of drug dependence. These processes include classical conditioning, operant conditioning, and cognitive mediation.

As a theory of relapse, the DDS postulates that readdiction liability is a direct function of the severity of the syndrome before abstinence was begun. Relapse is portrayed as the re-emergence of previously conditioned responses that had been associated with substance use. Recovery, on the other hand, is described in terms of the extinction of conditioned responses that takes place during or after treatment. Because the theory behind the drug dependence syndrome construct is a synthesis of both general learning theory and more specific conditioning models of dependence (Wikler 1965), it may be instructive to review related theories of alcohol and drug abuse whose assumptions complement or resemble those of DDS. This will provide a context for reviewing empirical evidence supporting or refuting hypotheses derived from DDS theory or related models.

TABLE 1

Constituent Elements of the Alcohol and Drug Dependence Syndrome

Elements	Interpretation/Examples
Narrowing of the repertoire	A tendency for the drinking or drug use to become stereotyped around a regular schedule of almost continuous daily consumption
Salience of substance-taking behavior	Substance use given higher priority than other activities, in spite of its negative consequences
Increased tolerance	More and more of substance required to produce behavioral, subjective and metabolic changes; large amounts of substance can be tolerated
Repeated withdrawal symptoms	Tremulousness, sweatiness, nausea, etc. after short periods of abstinence
Use to avoid withdrawal	Relief or avoidance of withdrawal symptoms by further substance use, especially in morning
Compulsion to use substance	Subjective awareness of craving for substance, as well as impaired control over quantity and frequency of intake
Readdiction liability	A tendency for the syndrome to be rapidly reinstated when substance use is recommenced after a period of abstinence

Based on Edwards et al., 1976; 1981.

RELAPSE THEORIES

Behavioral psychology has provided theories linking different elements of the drug dependence syndrome to relapse after treatment. Wikler (1965) proposed a model of opiate relapse based on respondent conditioning principles. In Pavlov's conditioning paradigm, a neutral stimulus is repeatedly paired with an unconditioned stimulus that naturally elicits an unconditioned response. With repeated trials, the neutral stimulus takes on the properties of a conditioned stimulus and elicits a conditioned response. In a regular drug user, certain environmental stimuli are repeatedly paired with pharmacologic withdrawal symptoms arising from episodes of acute abstinence between drug doses. These previously neutral stimuli become capable of producing conditioned withdrawal reactions long after cessation of drug use. These conditioned withdrawal reactions may be labeled "craving" by the addict or alcoholic, and prompt the individual to seek relief through substance use.

Siegel (1979) proposed a different mode of acquisition of conditioned craving. In his model, the environmental stimuli that reliably predict drug effects enable the addict to make adaptive, compensatory, physiological responses in anticipation of these effects. These conditioned responses are opposite to the acute drug effects and thus maintain homeostatic balance. This process can explain the development of tolerance. Furthermore, when these conditioned physiological responses are not followed by drug consumption, they may be experienced as conditioned withdrawal or craving. Thus, Wikler and Siegel used respondent conditioning to link drug craving, tolerance, and withdrawal. Impaired control can also be explained by this theory. The most reliable cue for drug effects are drug self-administration procedures. The process of "cooking up" heroin, gulping a first drink, or puffing on a cigarette in a previously dependent individual provides a complex of strong conditioned stimuli producing conditioned craving or withdrawal responses. Such responses may dramatically increase motivation for substance use and lead to a perception of loss of control. Ludwig and Wikler (1974) suggest a slightly different process underlying loss of control in alcoholics. They hypothesize that loss of control represents an inability to accurately utilize information from interoceptive cues (e.g., perceived intoxication) necessary to regulate the rate or quantity of alcohol consumed.

Although Wikler (1965) and Siegel (1979) developed their classical conditioning models based on opiate dependence, these conditioning concepts have been adapted to explain alcohol dependence (e.g., Ludwig and Wikler 1974) and nicotine dependence (Pomerleau 1981). An alternative behavioral conceptualization of relapse has been proposed by cognitive social learning theorists. Bandura (1977), writing about processes underlying all coping behavior, suggested that coping is partially determined by expectations that one is capable of performing a coping response. It has been suggested that the strength of an individual's expectation regarding coping, his or her perceived self-efficacy, influences the probability of relapse after first use of a drug following a period of abstinence. If individuals who are severely alcohol dependent also believe that they are unable to cope with temptation after a first drink, then rapid relapse in dependent individuals may be mediated by their low perceived self-efficacy (Rollnick and Heather 1982; Wilson 1978). In this view, the belief that one will lose control after a single drink becomes a self-fulfilling prophecy.

Some theories of drug abuse derived or borrowed from traditional reinforcement theory also incorporate a wide variety of other explanatory constructs. Thus, while Frederick (1980) views drug abuse as a learned behavior, personality and motivation are seen as particularly important in bringing about relapse. In McAuliffe and Gordon's (1980) combination of effects theory, it is the potential for enjoying opiate euphoria, in combination with the relative permanence of acquired reinforcers, that plays a crucial role in relapse. In this model, long-term abstinence by addicts is hypothesized to be facilitated by successful reintegration into society, which provides an alternative system of rewards. Zinberg (1980) has emphasized the influence of social settings that, operating through such mechanisms as social sanctions and rituals, play an active role in controlling use, even by those who at one time have been severely dependent.

The drug dependence syndrome model may also be seen as related to biologically-based theories which stress the ability of drugs and alcohol to alter body biochemistry and metabolism. Dole and Nyswander (1980) attribute relapse and the persistence of physical dependence to residual tolerance and metabolic deficiencies induced by opiate-type drugs. Schuckit (1980) believes that genetic factors play a role in the physiological drive to return to drugs, as mediated by a protracted abstinence syndrome, or through inherited psychological vulnerabilities.

This review of theories of alcohol and drug relapse suggests that relapse is a complex phenomenon with multiple determinants. Although many of the theories have been developed in terms of a single drug of abuse (e.g., alcohol, opiates), the following learning theory principles may be applicable to relapse with any substance: 1) classical conditioning of drug/alcohol related cues; 2) operant reinforcement of drug/alcohol seeking behavior; 3) cognitive mediation of conditioned responses; and 4) social reinforcement of recovery-related behaviors.

EMPIRICAL EVIDENCE

Having reviewed the DDS concept, the theoretical model that it is embedded in, and a number of related theories, we will now focus on some of the empirical research conducted to test hypotheses concerning the relationship between dependence concepts and relapse

Alcohol Dependence

Several alcohol administration studies have examined the relationship between dependence and reaction to a priming dose of alcohol. Hodgson et al. (1979) found that severely dependent alcoholics significantly increased, while moderately dependent alcoholics decreased, the speed with which they consumed a standard alcoholic drink 3 hours after consuming a priming dose. A subsequent study (Stockwell et al. 1982) independently manipulated the expected and actual alcohol content of a priming dose and found that severely dependent alcoholics increased their drinking speed after actual alcohol consumption, regardless of whether they were told the priming drink contained alcohol. This suggests the importance of internal, physiological drinking cues as triggers for craving in severely dependent drinkers. In another priming dose study, Kaplan et al. (1983) found that severely dependent alcoholics were more likely than moderately dependent alcoholics to choose an additional drink instead of a lottery ticket after a priming dose.

Marlatt and Gordon (1980) emphasize the importance of coping skills as mediators of relapse. Such skills may also mediate between dependence and relapse. Litman et al. (1977) found a relationship between the self-rated degree of alcohol dependence and the use of specific skills for coping with potential relapse situations. More dependent individuals tended to utilize thinking of the negative consequences and guilt associated with drinking. They also engaged in active behavioral avoidance of drinking-related situations more than less dependent drinkers. However, only avoidance was judged by them to be an effective coping strategy.

An important test of the validity and utility of the dependence syndrome concept is how well dependence predicts treatment outcome. Seven alcoholism treatment followup studies have assessed individual differences in severity of dependence. In the first such study, Orford et al. (1976) randomly assigned 100 married males to brief advice or more intensive treatment. Both treatments were abstinence-oriented. Sixty-five subjects and their wives were contacted 2 years after entering treatment. Among the 26 subjects with "good" outcomes, controlled drinkers were more likely than abstainers to obtain low scores on a seven-item dependence symptom scale.

The Rand study (Polich et al. 1981) followed a national sample of treated alcoholic males for 4 years. In an analysis of 200 subjects, alcoholics aged 40 or over who had high scores on a 6-item dependence scale were less likely to be drinking with dependence symptoms at 4 years posttreatment if they were abstinent at an 18-month followup. On the other hand, alcoholics under age 40 with low dependence scores on admission who engaged in moderate drinking at 18 months were less likely to be drinking with dependence symptoms at 4 years than those who were abstinent at 18 months. For the other two groups, older men with low dependence symptoms and younger men with high dependence symptoms, the interaction was more complex, with marital status playing an important role.

In the first analysis of alcohol dependence in female subjects (Hesselbrock et al. 1983), 67 male and 47 female treated alcoholics were followed after abstinence-oriented inpatient treatment. A dependence symptom scale was significantly correlated with drinking status at a 6 month posttreatment followup for male subjects but not for female subjects.

Heather et al. (1983) administered the Severity of Alcohol Dependence Questionnaire (SADQ; Stockwell et al. 1979) to 35 male and 15 female inpatient alcoholics. Six months after abstinence-oriented treatment, 67 percent of the subjects were contacted. The SADQ did not significantly predict abstinence versus drinking, and, among the drinkers, the SADQ did not predict regular nonproblem drinking. In addition to assessing severity of dependence at intake, subjects completed a scale assessing beliefs about their control over drinking. This "Subjective Dependence Scale" significantly predicted regular nonproblem drinkers among those reporting any drinking at the posttreatment followup. These results support the contention that a relationship between dependence and relapse is mediated by beliefs about control over drinking (Wilson 1978).

Litman et al. (1984) followed a sample of 194 men and 64 women treated in an abstinence-oriented inpatient program. A 6-item dependence questionnaire did not discriminate light/moderate drinkers from abstainers and relapsers at a 6- to 12-month posttreatment followup.

Foy et al. (1984) randomly assigned 62 male veterans to behavioral inpatient alcoholism treatment with or without training in controlled drinking skills. A five-item dependence scale was administered at admission to treatment. All but three subjects were followed up 12 months post-discharge. Pretreatment dependence was significantly correlated ($r=-.22$) with a variable reflecting the percentage of drinking days in which alcohol consumption was moderate. Although this correlation was statistically significant, the clinical significance of the prediction is questionable.

Finally, an unpublished study by Kivlahan et al. (in press) followed a sample of 268 male veterans in inpatient alcoholism treatment. Pretreatment dependence was assessed using the Alcohol Dependence Scale (ADS) (Skinner and Allen 1982). Nine-month followup interviews were completed on 78 percent of the sample. Although the ADS did not predict amount of drinking, there was a weak but reliable association with drinking relapse status ($r=.16$), with relapsing patients obtaining higher ADS scores at admission.

In summary, at least seven studies have examined the relationship between pretreatment alcohol dependence and posttreatment outcome. One study found a strong relationship between dependence and controlled drinking, but in an analysis of only 26 subjects (Orford et al. 1976). Two other studies found that predictions based on dependence were moderated by age, marital status (Polich et al. 1981), or gender (Hesselbrock et al. 1983). Two studies found that predictions were statistically but not clinically significant (Foy et al. 1984; Kivlahan et al., in press). Finally, two studies found no reliable predictions could be made from dependence measures.

There are several possible reasons for equivocal or conflicting findings in the above studies. Perhaps there are major differences between the various dependence scales employed. However, Cooney et al. (1986) found that four different dependence scales were highly correlated with one another and thus were functionally equivalent. Various outcome measures were employed in the studies, including relapse status, light or moderate drinking, and drinking without dependence symptoms. Only the latter provides a true test of the reinstatement hypothesis (Polich et al. 1981) and no study measured rapidity of reinstatement. Finally, widely varying statistical methods were employed in these studies. It may be necessary to control for age, marital status (Polich et al. 1981), gender (Hesselbrock et al. 1983), and beliefs about control (Heather et al. 1983) to examine the predictive validity of dependence measures.

Nicotine Dependence

Nicotine dependence has been thought to underlie tobacco smoking. Russell (1974) stated that there is "little doubt that if it were not for the nicotine in tobacco smoke, people would be little more inclined to smoke than they are to blow bubbles or to light sparklers" (p. 793). Evidence for the role of nicotine in tobacco smoking comes from studies of nicotine regulation, tobacco tolerance, and tobacco withdrawal phenomena.

Jarvik (1979) asserted that tolerance to tobacco products has been clearly demonstrated in both humans and in animals. A tobacco withdrawal syndrome has been identified (Shiffman 1979) with much individual variability but some consistent patterns. Objective indicators of the withdrawal syndrome include changes in EEG and cardiovascular function, decrements in psychomotor performance, and weight gain. Subjective symptoms include irritability, anxiety, inability to concentrate, insomnia, and craving for cigarettes. Although Shiffman (1984) has more recently questioned the importance of withdrawal symptoms in promoting relapse after smoking cessation, others have suggested that managing these symptoms may be crucial to the maintenance of nonsmoking (Jarvik 1979).

Investigators have attempted to measure individual differences in smokers' degrees of nicotine dependence. The most widely used measure of smoking dependence is dosage, measured by self-reported smoking rate, serum nicotine, or its metabolite cotinine. Studies that used biochemical measures of dosage reported more consistent relationships between dosage and tolerance, withdrawal, and cessation success (Hughes 1984). For example, Hall et al. (1984) followed 114 smokers in a behavioral smoking cessation clinic. Although self-reported pretreatment smoking rate, self-reported nicotine dose per day, and cotinine level predicted abstinence status up to 1 year after treatment, cotinine level was found to account for more variance in outcome than the other measures. Since the half-life of cotinine is approximately 20 hours, blood levels of cotinine may provide an accurate index of daily nicotine intake.

Several questionnaires have been used to assess dependence phenomena related to smoking. Fagerstrom's (1978) "Tolerance Questionnaire" has been validated against physiological measures of withdrawal (temperature change) and tolerance (heart rate response to smoking). Other studies have failed to replicate the relationship of the questionnaire to withdrawal and tolerance (Hughes and Hatsukami 1983). Shiffman and Jarvik (1976) developed a questionnaire to measure withdrawal reactions. Pomerleau et al. (1983) found that heavy smokers reported more withdrawal symptoms on this questionnaire than light smokers after overnight cigarette deprivation.

A crucial test of the clinical value of the dependence construct is to demonstrate that dependent smokers are especially likely to benefit from dependence-based treatment. Two treatment procedures have recently been developed that take nicotine dependence into account. Monitored nicotine fading is a behavioral procedure wherein subjects switch to cigarette brands with progressively lower nicotine content (e.g., Foxx and Brown 1979). Nicotine chewing gum is a pharmacological approach. We are not aware of any research showing that dependent smokers are especially responsive to nicotine fading procedures. But at least seven studies have examined the relationship between dependence and response to nicotine chewing gum. Two studies using dosage (Brantmark et al. 1973; Hall et al. 1985b) and five studies using the Fagerstrom questionnaire (Christen et al. 1984; Fagerstrom 1982; Hall et al. 1985a; Hughes and Hatsukami 1983; Jarvik and Schneider 1984) found that dependent smokers had higher quit rates on nicotine gum than without the gum, while nondependent smokers had similar quit rates with or without nicotine gum.

Opiate Dependence

Although no specific research has been conducted to test the predictive validity of the DDS concept in samples of opiate addicts, there is considerable evidence for the existence of syndrome elements in the cycle of addiction and relapse observed in chronic opiate users. Donegan et al. (1983) and McAuliffe and Gordon (1980) have reviewed the literature and concluded that: 1) opiates have a high potential to serve as reinforcers; 2) repeated administration of opiates typically results in the development of pronounced tolerance and physiological dependence; 3) stimuli associated with habitual administration can elicit a variety of compensatory or withdrawal effects; and 4) former heroin addicts are especially vulnerable to relapse when in stressful situations. However, in one of the most extensive tests of Wikler's notion of conditioned abstinence, Meyer and Mirin (1979) did not confirm the hypothesis that opiate craving is internally signaled by the unpleasant effects of withdrawal. Rather, craving was most likely when subjects had cognitive expectancies about the availability of heroin. Furthermore, Chaney et al. (1982) reported that only 16% of 38 opiate relapse episodes could be attributed to conditioned withdrawal defined as negative physiological states not associated with prior substance abuse.

In summary, the empirical evidence suggests that severity of dependence may be an important determinant of relapse to use of alcohol, opiates and tobacco, but further research is needed to confirm this hypothesis. The severely dependent person is likely to have a narrow range of effective coping strategies. He or she may experience conditioned craving or withdrawal symptoms, especially after a priming drug dose. Such a person is also likely to have little belief in his or her ability to control consumption once it is started.

EVALUATION AND CRITIQUE

Before attempting to evaluate the adequacy of the DDS construct as an organizing principle for a theory of relapse behavior, it will be important to consider briefly the more general issue of minimal standards for establishing a theory of relapse. Modern behavioral science derives many of its methods and assumptions from the principles of natural science. These include the requirements that: 1) the theory leads to empirical predictions which can determine its validity by their confirmation; 2) the terms in the predictions be operationally defined and the conditions clearly specified; and 3) the possibility exists to disprove the theory. These minimal criteria, accurate prediction, public verifiability, and scientific falsifiability, are complemented by such characteristics as breadth, depth, uniqueness, elegance, and clinical utility. For example, theories whose derivations permit causal control over important aspects of behavior are more useful than those that do not. Also desirable are theories that encompass many empirical phenomena and derive predictions from a relatively parsimonious set of assumptions. First, it should be noted that the DDS model is fairly representative of other theories in the general field of alcoholism and drug dependence (Lettieri et al. 1980). In its broader outlines, it is rather loosely constructed and incorporates a wide variety of antecedent and explanatory variables. Where it differs from other theories is in its attempt to tie together biological, psychological, and social variables in a network of reciprocal causation using concepts borrowed from learning theory. The syndrome elements are the building blocks of the theory. The syndrome concept, borrowed from clinical medicine, is the basis for defining the shape and boundaries of dependence. Learning theory is the glue that holds the model together and provides the derivation of postulates and hypotheses.

With regard to the criterion of accurate prediction, DDS theory and related learning theory models do suggest rather clear hypotheses about mechanisms of relapse. They are less clear about the implications of high dependence for recovery, except to suggest that with increasing time, the conditioned responses evoked by environmental and interoceptive stimuli should be extinguished, thereby making abstinence more likely and easy to maintain.

A major problem with the criterion of public verifiability is the operational definition of syndrome elements and related constructs. The Alcohol Dependence Syndrome was postulated as a provisional formulation, and was based on a combination of clinical experience and theoretical speculation (Edwards et al. 1976, 1977). The Drug Dependence Syndrome model was formulated in the context of a discussion of nomenclature and classification of alcohol- and drug-related problems (Edwards et al. 1981). This should be kept in mind when considering the model as a formal theory of dependence.

The definition of several syndrome elements presents difficulties. Research attempting to establish operational measures of the elements that are reliable and valid is needed. "Narrowing of the drug-taking repertoire" suggests that the individual's drug use is stereotyped and functionally autonomous. The element "salience of drink- (drug-) seeking behavior" contends that priority in maintaining drug intake supplants the individual's attention to personal, interpersonal, and social obligations. Both of these elements describe gross, macro-level behavioral phenomena that represent much more complicated levels of analysis than the elements of withdrawal and tolerance. "Subjective awareness of compulsion to drink (take drugs)" is another element that is somewhat unclear. For example, it is uncertain whether the individual ingests the drug and loses control, or decides not to exercise control over the amount of the drug that is taken into the system. The inclusion of a cognitive element in the dependence syndrome raises questions about the role of private experience in a scientific theory of behavior. Given the general acceptance of subjective feelings and thoughts in contemporary behavioral science, their inclusion in this model is no more problematic than other cognitive behavioral theories that emphasize the importance of cognitive mediation. The final element, reinstatement of the syndrome, is a characteristic rather than an element of the syndrome, and can only be operationalized by a synthetic combination of the syndrome elements. When considered in this way, reinstatement becomes an hypothesis to be tested under specific conditions, such as when a "slip" occurs for an abstinent alcoholic.

The operationalization of elements (i.e., establishing loose parameters) of the DDS construct has just begun to occur and has already been subject to a variety of disciplinary interpretations. Whether these elements do in fact cluster, and are interrelated aspects of the same syndrome can only be borne out by further research.

Critics of the dependence syndrome concept have contended that owing to its phenomenological ambiguity, it is but another restatement of the traditional disease concept (Shaw 1979). The argument that the syndrome is a restatement of the disease concept stems from the tendency to interpret the syndrome primarily in psychobiological terms. Syndrome proponents have provided a less than complete explanation of both behavioral and subjective mechanisms underlying the syndrome. Edwards and Gross (1976) do state that should a clinician opt to use the syndrome for diagnostic purposes, a "conservative approach is generally the most responsible, and that abstinence is normally the safest choice of goal" for treatment. Critics have seized this position as reflective of syndrome proponents' orientation toward abstinence and the traditional disease concept. Syndrome proponents, however, dismiss the disease concept since it is too confused for empirical inquiry. In summary, the strength of the DDS is also its weakness, in that ambiguity prompts attempts to establish operational definitions of the elements, and also fosters idiosyncratic and unidisciplined efforts to define syndrome elements and the syndrome itself. Attempts to examine and study the syndrome have opened a heretofore dichotomously labelled (i.e., alcoholic versus not alcoholic, dependent versus not dependent) area of clinical inquiry. Regardless of Edwards' and Gross' formulation, interest in drug dependence has been engendered and has suggested avenues for research into biological, behavioral, and situational determinants of relapse.

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ACKNOWLEDGMENTS

The writing of this paper was supported by grants from the National Institute on Drug Abuse (R01 DA 3814) and the National Institute on Alcohol Abuse and Alcoholism (T32 AA 07290, P50 AA 03510, and K01 AA 00025).

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Acquisition, Maintenance, Cessation, and Reacquisition: An Overview and Behavioral Perspective of Relapse to Tobacco Use

John Grabowski

Tobacco use is a prototypic case of drug dependence and an appetitive habitual behavior. It encompasses many of the phenomena studied in the behavioral pharmacology laboratory and related clinical settings. It also has been studied by scientists and clinicians representing a wide range of other theoretical and disciplinary orientations. Acquisition, maintenance, and treatment of tobacco use have obvious elements of, and commonalities with, drug self-administration models, schedule induction models, coping models, social learning models, and others. More important, it represents a spectrum of biobehavioral disorders which ultimately and unfortunately produces patients for practitioners of behavioral or medical disciplines. Therefore, [illegible] and systematic analysis of tobacco use presents a unique opportunity to contribute to both the treatment of drug abuse disorders and the broader area of behavioral medicine disorders. Despite the extensive literature and considerable interest in the area, the apparent success in the treatment of tobacco use has not been notable. This chapter will include consideration of various theoretical perspectives, a basic behavioral analysis, and a view toward future research and treatment strategies.

THEORIES OF ACQUISITION, MAINTENANCE, CESSATION, AND RELAPSE

Wesson et al. (this volume) have argued that "having a theoretical framework is important in providing drug abuse treatment because treatment guided by theoretical constructs results in clear decisive interventions." It is not at all clear that this has been the case in drug abuse treatment, despite the fact that theories are myriad and proliferating. For example, a volume titled Theories on Drug Abuse (Lettieri et al. 1980) presented 43 alternative theories. These theories were grouped into four areas, including "relationship to self," "relationship to others," "relationship to society," and "relationship to nature." Nevertheless, none of these theories can be viewed as amply descriptive or predictive to greatly enhance treatment and, thus, they do not achieve the goal proposed by Wesson et al. Instead, a sound set of practical therapeutic recipes with parallel tracks and options based on the best available data, may be what is needed to guide treatment of drug abuse in many of the settings in which it is practiced.

Thompson, citing Claude Bernard, has noted vis a vis theories, that

> these men start, in fact, from an idea which is based more or less on observation, and which they regard as an absolute truth. They then reason logically and without experimenting, from deduction to deduction they succeed in building a system which is logical but which has no sort of scientific reality . . . the mind becomes bound and cramped by the results of its own reasoning; it no longer has freedom of action and so lacks the power to break away from that blind faith in theories which is only scientific superstition. (Thompson 1984, p. 213)

It can readily be argued that "theory" in its least intrusive form might be useful. Unfortunately, theory builders in the drug abuse arena have not sought to be unobtrusive, as even the casual reader of Lettieri et al. (1980) would discern. And, in the area of etiology and treatment of tobacco use, Leventhal and Cleary (1980) as well as Cummings et al. (1980) have argued that there is a need for theory. Ironically, Leventhal and Cleary decry the schism between various research perspectives and the failure of integration without noting that this is a common result of building theoretical edifices.

Generally accepted is the view that the benefit and merit of theories resides in the generation of studies which, in turn, will support or refute their premises. One might question whether our techniques are so poor, and our science so weak, that we can only do battle in the arena of the straw men (people?) concocted from current theoretical models. Rather, at this point, a robust description derived from sound research may be of the greatest utility. In turn, there is a need to recognize conditions, well beyond the scope of any therapeutic intervention, which contribute substantially to the problems of tobacco use.

Lichtenstein (1982) observed that the tobacco literature is so vast that inclusive surveys are untenable. It is now also the case that theoretical analyses become unduly encumbered in attempts to account for the manifold results with many disparities. Since theories can generate research far beyond the need, they may, at this point, hinder rather than breed success in the therapeutic domain. More data in the realm of basic research may well be of value since it has been from this source that much of the current precision in therapeutics has arisen. In summary, what is needed more than a "good theory," as proposed by some authors, is a good description of the behavior as provided by Lichtenstein (1982), Lichtenstein and Brown (1982), and others, and in turn, an integrated therapeutic strategy based on the data.

A PARSIMONIOUS DESCRIPTION OF ACQUISITION, MAINTENANCE, AND ELIMINATION OF TOBACCO USE

A question has emerged, particularly recently, as to why the study of tobacco use is relevant to the issue of drug abuse. There are several often-stated reasons. First, tobacco use in its several forms is a clear public health problem and thus, for direct clinical-scientific reasons, it is worthy of study. Second, as previously noted, the study of tobacco use is in many respects a prototypic, health-impairing, appetitive, habitual behavior which has commonalities with a wide range of other biobehavioral (as well as social-behavioral) disorders (Pomerleau 1979, Levinson et al. 1983). And third, tobacco use generally, and smoking in particular, has all of the characteristic elements of other forms of drug abuse. That is, the rate and pattern of the behavior itself, the paraphernalia associated with use, and the pharmacological agent, give rise to the view that this is a prototype which will likely give considerable insight into drug abuse and other disorders (see Henningfield 1984).

ACQUISITION

The theoretical literature (e.g., Lettieri et al. 1980) provides a broad range of options in specification of the generative conditions for acquisition of drug abuse. Distilled, these have several essential elements (rarely clearly stated), for example, physiological, behavioral (including "cognitive" components), social, environmental, and pharmacological factors, and their interactions.

The conditions antecedent to sustained drug use include social factors, commonly in the form of friends and family; environmental factors, including drug availability; and biological factors, including the possible predisposition to the reinforcing properties of the pharmacological agent itself. However, the relative contribution of these factors to an individual's first use of tobacco varies.

Clearly, the event of initial use is multiply determined, and results from the interaction of diverse factors to which most people in Western culture are exposed from a very young age. Perhaps a major environmental difference for young people is the frequency of tobacco use in their immediate environment by parents and siblings. The importance of the presence of tobacco-using parents in the home may be twofold: first, there exists a basis for learning through modeling; and second, in view of recent data on passive smoking, it is likely that there could be gradual evolution of tolerance to the aversive properties of cigarette smoke through chronic low-grade exposure.

While acknowledging that offspring of those who do not use tobacco do initiate use, and that the converse is true as well, most learning models would predict "imitation" or "modeling" to be a major antecedent to initial use. In the absence of this major risk factor (Surgeon General's Report, 1979), there exist the range of early exposures serving as sufficient alternative stimulus arrays which are setting conditions for the initiation of smoking. They exist in the media, in the behavior of peers, and the general evidence of acceptability of tobacco use in public settings. (In this regard, the development of isolated smoking salons in public environments might have benefits well beyond those typically suggested.)

As Lichtenstein has noted (1979, 1982), there are more than adequate numbers of descriptions of this acquisition process, and an abundant supply of speculative accounts. However, it is patently clear that the complex and intricate theories in this domain have contributed little more to the development of an understanding of the acquisition process.

Perhaps the most parsimonious description of tobacco and nicotine use derives from animal and clinical laboratory studies. These data can be succinctly summarized. When nicotine is made available on a response-contingent basis and delivered via an indwelling intravenous catheter, persistent drug self-administration evolves. As often described in the behavioral pharmacology literature, this simple demonstration indicates the lawfulness of the process of drug self-administration. The appropriate direct parallel of inhalation has also been studied in both the animal and human laboratories and clinical settings (e.g., Jarvik 1967; Griffiths et al. 1982; Gust and Pickens 1982). To paraphrase and extrapolate to the natural environment: when tobacco is made available and when the conditions for use are established through diverse stimulus conditions--

including advertising, parents, peers, and others--the teenager engages in self-administration.

A particularly interesting relationship illustrating the parallels between nicotine self-administration in the laboratory and tobacco use in the natural environment is the finding by Salber and Abelin (1967) indicating that 85% to 90% of those who smoke four cigarettes become chronic smokers. In the laboratory setting, following initial exposure (at times provided by an investigator-initiated priming dose--peer pressure?), the probability of acquisition of self-administration is similarly high.

The self-administration model and the extensive database on the importance of specific reinforcement schedules and stimulus conditions as determinants of drug use promulgated by behavioral pharmacologists, is not widely accepted by those who theorize on drug abuse, its treatment, or relapse. Nevertheless, these data point to the essential ingredients of a powerful, manageable, and perhaps most important, useful model of acquisition of tobacco use (Henningfield 1984).

Further microanalysis of environmental determinants of initiation of tobacco use for the individual is not necessary here, and there are ample sources on which the scientist or clinician can draw. There is clearly a substantive database indicating the power of a range of environmental factors as contributors to the initiation of use.

MAINTENANCE

Maintenance of tobacco use has also been the focus of complex theoretical machinations. Oral gratification and other descriptions readily succumbing to Occam's razor are numerous. Lichtenstein (1979, 1982) has described the general factors associated with maintained use of tobacco. Frederiksen (1979) has similarly listed factors in the context of controlled smoking, and Pomerleau (1979) has provided an overview of factors within the context of reviewing commonalities of what he terms self-management disorders. More recently, Pomerleau and Pomerleau (1984) have specified a series of neurotransmitter alterations and physiological effects of nicotine administration and abstinence which are correlated with well-documented behavioral manifestations. Henningfield (1984) has provided an excellent comprehensive review directed at summarizing the behavioral pharmacology of cigarette smoking. Viewed in combination, the preponderance of evidence points to orderly and systematic patterns of sustained tobacco use modulated by an array of environmental and pharmacological factors. And, this evidence stands without recourse to elaborate hypothetical constructs.

Clinical and animal laboratory studies have provided clear data on the role of both operant and classical conditioning in the maintenance of drug use generally (e.g., see Grabowski and O'Brien 1981) and tobacco specifically (Pomerleau 1979; Pomerleau and Pomerleau 1984). It is clear that the dominant active pharmacological agent in tobacco, nicotine, can serve to strengthen and maintain behavior, which leads to its administration for nonhuman and human subjects alike (Goldberg et al. 1981; Henningfield and Goldberg 1983a and 1983b). Use of nicotine via smoking or smokeless tobacco is more complex for humans in their natural environment, not so much for the character and pattern of self-administration which closely resembles the behavior engendered in the laboratory, but for the manifold interactions between smoking, other behaviors (including concurrent use of drugs such as caffeine or ethanol), and other, abundant environmental conditions and events, i.e., the context.

Fortunately, laboratory research with both humans and animals has provided a means for systematically examining both behavioral and environmental factors. The relative power of environmental stimuli as determinants of drug-taking has been amply demonstrated (e.g., Goldberg and Shuster 1967, 1970; Schuster and Woods 1968; Davis and Smith 1974; Thompson et al. 1971; Carnathan 1977; Goldberg 1973), and these factors have been repeatedly referred to as contributing to relapse (Wikler 1965, 1974, 1977; O'Brien et al. 1974, 1975, 1977, 1980; O'Brien and Ternes 1977; Childress et al. 1985). Only a few of the relevant studies have been cited, but the potential contribution of these factors in sustained drug use is clear. There can be little question of their importance and influence in the natural environment.

While characteristics and patterns of self-administration evidenced in experimental settings parallel those under natural conditions, the cumulative frequency of dosing by inhalation through cigarette smoking may be far beyond that studied for any agent in laboratory settings. As Pomerleau has noted, the average one-pack-per-day smoker emits puffing behavior 70,000 times per year. Few other behaviors are so regularly emitted and reinforced. In turn, few other reinforcers and the antecedent behaviors are so regularly associated with a plethora of environmental stimuli which then further contribute to maintained drug-taking. These relationships have been summarized by Lichtenstein (1982), Henningfield (1984), and others. Thus, there are both laboratory-based accounts (e.g., Nevins 1979) and clinical data that predict the strength of maintained tobacco use without reference to elaborate theoretical constructs.

It must be emphasized that the strength and persistence of a behavior determines the ease or difficulty with which it will be changed. A satisfactory case can be made that a range of simple appetitive behaviors occurring in diverse environments with great frequency are particularly impervious to modification. This has been evidenced by the seeming lack of success of the techniques used to alter these behaviors, including tobacco use.

TREATMENT AND CESSATION

Tobacco use cessation efforts are numerous and diverse. Grabowski and Hall (1985) defined five interdependent levels and modalities of cessation efforts, including public intervention or information campaigns, self-help programs, group support programs, individualized behavioral intervention programs, and pharmacological interventions. Pechacek (1979) outlined the categories somewhat differently, but the parallels are clear. The origins of the programs vary. Some have evolved from the standard strategies of publicly addressing health problems, while others have been derived from rather elaborate theoretical schema (e.g., Marlatt 1982, 1985) and still others have derived from precise clinical science (e.g., Hall et al. 1984, Hall and Miller 1985).

Historically, the success of drug abuse cessation efforts generally, and tobacco use cessation in particular, have not been notable. Furthermore, in the area of smoking the results appear to many to be less impressive since tobacco use is traditionally viewed, even by some clinicians, as a trivial habit. Like all "habits," it is considered subject to modification through a modest infusion of "essence of will power." In any case, the lack of successful interventions was best summarized, and perhaps "justified," by the data of Hunt et al. (1971) as depicted in the widely published figure comparing reacquisition of heroin, alcohol, and tobacco use after treatment ("relapse"). Treatment success, as defined by continued abstinence at 3 to 12 months, has hovered between 20% to 30%.

Lichtenstein (1982), Pechacek (1979), Pomerleau (1979), Marlatt (1985), and others have suggested that behaviorally based techniques--(variously labelled behavioral intervention, behavior modification, behavior therapy, and the like)--have reached inherent limits. As Marlatt (1985) indicated (following Lichtenstein's 1982 observation), one consequence of limited success was an increase in the use of multimodal strategies which proved to be no more successful than the simpler strategies. However, it should be noted that Marlatt enunciates this view in the context of the presentation of an elaborate model of "Relapse Prevention" not dissimilar from many of the multimodal programs. In addition, it should be noted that Leventhal and Cleary (1980), in their thorough review, indicated that increments were evidenced in some, but not all, multimodal programs. It is interesting that despite elaboration and reiteration of essentially the same basic techniques, smoking cessation program success rates remain inexplicably low given the energy invested therein, although there are a few notable exceptions. For example, in two separate programs, Hall and Killen (1985) have described results with combinations of "skills training" and nicotine gum which approach the 50% success rate at 12 months. The focus of the programs appears to be a few essential elements derived from the extensive repertoire of clinical behavioral scientists with special attention given to the behavioral and pharmacological consequences as well as correlates of tobacco use and cessation.

While multimodal treatments have been generally criticized, some of the criticisms are specific. For example, Lichtenstein (1982) noted that at times, the combined treatments were made up of components which had not been demonstrated to be effective. Combined treatments may well be effective, as demonstrated by Hall and Killen (1985) and Hall et al. (1984). The combined treatments may be additive or synergistic; however, these greater changes will not occur because of their combination per se but because of the inherent effectiveness of the combined treatments themselves. Several other points concerning treatment are worth noting. As cited above, there has been extensive research concerning the role of stimulus factors established through operant and classical conditioning and there has been extensive comment in the literature on this issue. However, no program has adequately dealt with the role of these stimuli in intervention. Indeed, there has been greater attention to these events in treatment for alcohol and opiate abuse (e.g., Marlatt 1985, Childress et al. 1985), and yet the role of such stimulus factors in tobacco use may be greater given their ubiquitous character.

A second major concern in treatment is linked to the duration and strength of the behavior in question, as discussed earlier. It is impressive that treatment programs are effective to the extent that they are, given their brevity and lack of intensity compared to the usual tobacco use history.

A third point of interest is that the effectiveness of treatment programs might be greatly enhanced if implementation were in conjunction with naturally occurring and related environmental events (e.g., see Bigelow, this volume). In the main, interventions are established in special settings under conditions which make compliance and attendance at treatment sessions difficult. Alternatively, they take the form of "self-help" programs of uncertain utility.

Initiating treatment at moments of other health-related interventions (Bigelow, this volume) or in relation to work or other environments might well convey greater strength to many therapeutic strategies. There are both behavioral markers and environmental conditions providing more suitable points for interventions. The potential for altering critical features for tobacco use cessation goes well beyond other drug abuse treatment, in part because of the general social tolerance of the behavior. While one cannot, for example, publicly announce and implement a cocaine treatment program at 12:30 p.m. each day on company premises and expect high levels of voluntary attendance, tobacco use cessation programs have been established in this fashion. In brief, treatment programs have not consistently attended to major obvious behavioral and environmental features which might enhance success.

REINITIATION, REACQUISITION, OR RELAPSE

The focus of this volume is relapse (to drug use). There are two terminological issues which cloud the discussion in both philosophical and practical terms. The application of the word to the behavioral phenomena falling under the rubric of "relapse" is unfortunate, as noted by Marlatt (1985). It connotes, coincident with its origins in a medical model, a dichotomous state. One "has" the "disease" of drug abuse or one does not. The conceptual error is evident in the phrasing. One "has" the disease or condition of diabetes, cholera, trisomy 21, or hepatitis, but one engages in the behavior of drug abuse. Behavioral factors of drug abuse generate physiological consequences that a patient "has," and they must be medically treated. However, it is well documented that these treatments do not ameliorate the original behavioral disorders. Thus, one can relapse to illness, but relapse to drug abuse is an inept articulation of the problem. Marlatt (1985) redeems "relapse" through the use of a corollary definition, although it would be most appropriate to place it in the same pasture with the word addiction, which has also grown ungainly with age (Grabowski and O'Brien 1981).

It appears that behavior and debilitating consequences of drug abuse are best described by the previously considered behavioral-pharmacological model and terminology. The individual acquires the behavior of drug use (in this case tobacco use) as previously noted. This behavior is strengthened and maintained by interacting behavioral pharmacological and environmental factors. It is eliminated as a consequence of one or more levels and models of intervention (Grabowski and Hall 1985, Pechacek 1979).

Interestingly, laboratory models for the study of drug abuse acquisition and maintenance parallel closely the human case in the natural environment. In addition to the studies already cited, there has been explicit attention devoted to analysis of naturally occurring behavioral sequences such as those represented by concurrent administration of ethanol, opiates, amphetamines, caffeine, and other agents with tobacco use (Griffiths et al. 1976; Kozlowski 1976; Schuster et al. 1979; Henningfield and Griffiths 1981; Mell et al. 1980a, 1980b; Mintz et al. 1981).

Ostensibly, it is in the area of elimination and reacquisition of the behavior that the behavioral pharmacological analysis derived from the laboratory appears not to be applicable because of the conditions under which treatment is usually implemented. However, there are numerous studies in which cessation of drug self-administration has been examined inadvertently or otherwise, and this literature has been concisely and articulately reviewed (Poling and Appel 1979). Occlusion of an infusion catheter results in cessation of responding for drug.

The explicit experimental manipulation of making an infusion pump inoperative likewise leads to cessation of responding. Administration of an opiate antagonist or mecamylamine to the subject (human or nonhuman), self-administering morphine or nicotine, respectively, leads to cessation of drug-taking. "Preloading" reduces drug-maintained responding. In brief, nonavailability of a previously self-administered drug or the functionally similar manipulation of blocking or reducing its effect leads to abstinence.

Reestablishing conditions for self-administration by unclogging the catheter, reactivating the infusion pump, or discontinuing antagonist (or agonist) administration leads to reinitiation of self-administration ("relapse"). Over successive nonavailability conditions, cessation (i.e., extinction, failure to respond) occurs more rapidly. Similarly, reinitiation of the behavior also occurs more rapidly within the constraints of pharmacological effects (i.e., gradual reemergence of opiate tolerance is related to gradual reacquisition of previous levels of self-administration). There are similarities between some of these conditions and the elimination of human drug-taking (Poling and Appel 1979).

The discrepancies and divergence between these laboratory cases and the human case are clear and the fundamental antecedents to reacquisition are similarly evident. Furthermore, the problems are more evident in the case of tobacco use than for other forms of drug use. The elaborate methodologies, models, and theories currently evolving reside in an anomalous social and therapeutic condition which should be considered.

Clearly, all therapeutic strategies contend with the fact that the drug nonavailability condition exists to some degree for some drugs and is nonexistent for tobacco use. Attending to this issue, Wikler (1965) suggested there is a need to remove the drug user from the environment during treatment, thereby modifying the risk of relapse. Grabowski et al. (1984) have noted that the advantage of this strategy is obviated by the fact that when reintroduced to the natural environment, the individual remains susceptible to the diverse stimuli previously associated with drug use. Concurrently, it is evident, as proposed by Childress et al. (1984), and others, that presentation and extinction of the discriminative and conditioned stimuli during the period of removal from the drug use environment may reduce the strength of these stimuli. This might reduce the probability of reacquisition of drug-taking when the individual returns to the natural environment. This strategy has not, however, been effectively implemented. In the case of tobacco use, it may be practical to implement, in addition to other behavioral strategies, discrete regular sessions in the natural environment to reduce the probability of reacquisition.

It has been noted that many of the basic elements of tobacco use are common to drug abuse as well as other biobehavioral disorders. The drug self-administration model applies admirably to conditions of acquisition and maintenance. It appears to apply less well to cessation and maintenance of cessation, or its inverse, reacquisition, not because of a failure in the description but because of the anomalous conditions under which cessation strategies are initiated and abstinence must be maintained. Walker and Lidz (1983) have discussed this issue and summarized it in terms of normative and control ambiguity. That is, there are social and contextual factors which concurrently and emphatically direct use and vigorously oppose use. In the laboratory, parallel stimulus conditions can be established. The formal study directed at analysis of this issue has not been undertaken. However, there are ample parallels. The prediction is readily made that, when presented with (a) stimuli associated with the null condition (no drug availability) and (b) stimuli associated with the powerful drug effects and drug availability itself, drug-taking is highly probable. It is clear that appropriate steps must be taken to reduce the strength of stimulus factors precipitating reinitiation of use.

Provided with the conditions described concerning the context of precluding reacquisition, or "relapse prevention," several facts are evident. First, one can delineate, as has been done with great precision and care, the conditions under which cessation is likely to be maintained, and these discriminations can be made along the dimension of stimulus variables, coping strategies, individual characteristics, or social environs (e.g., Lichtenstein and Brown 1982; Marlatt 1985, Shiffman 1982, Havassy et al., in preparation). Second, based on the data derived from these studies as well as the refinements made to date in relatively simple but effective strategies (e.g., Hall and Killen 1985; Hall et al. 1984, Lichtenstein and Rodrigues 1977), improved success rates are probable. In turn, these efforts, combined with the gradual shift in perceptions concerning smoking, if not smokeless, tobacco effects, may further enhance success rates. In brief, the focus, albeit sometimes distorted, on the multiple factors contributing to reacquisition can be predicted to provide gradual improvements in outcome. Most important is that it appears that the behavioral strategies considered here aptly describe the situation and, when judiciously and systematically applied, they are likely to be effective.

CONCLUSIONS

The primary point of this chapter is that there has been extensive laboratory and clinical research devoted to the analysis of behavioral mechanisms of acquisition, maintenance and elimination of drug-taking. The results have been translated, with varying but increasing success, to the clinic. Unfortunately, there has also been increasing and perhaps disproportionate attention to theory development rather than refinement of the simplest effective treatment strategy. This is not to ignore the utility of theory in some situations. Instead, it is suggested that, at least in the area of smoking cessation, and quite possibly in other areas of drug abuse and biobehavioral disorder treatment, effective implementation based on current data rather than further theory development, is needed.

Finally, the above considerations not withstanding, the major problem confronting therapists and scientist-clinicians is the previously noted anomalous environment in which the therapeutic strategies are devised; that is, an environment in which tobacco use is not only legal but substantially encouraged on one hand and deemed hazardous and unacceptable on the other hand. This issue is not resolvable through better theory. The greatest increments in enhancement of the diverse interventions will come less from future refinements in the techniques (which are already quite striking in their effectiveness), and more through changes in the social environment via legislation and public policy. In particular, attention must be given to all of those steps which would reduce the availability and complexity of the conditions under which the interventions must be implemented. In the interim, those engaged in the development of more effective interventions can perhaps take solace in the fact that the elegance and overbuilt character of the resulting interventions will likely be extremely useful in resolution of other diverse biobehavioral disorders.

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Relapse and Recovery in Substance Abuse Careers

James F. Maddux and David P. Desmond

During the 1950s it was often asserted that few individuals ever recovered from addiction. Then, in the 1960s, Winick (1962, 1964) produced data suggesting that approximately two-thirds of narcotic addicts mature out of their addiction in their thirties. Subsequent long-term followup studies have pointed to a truth somewhere between these two extremes of pessimism and optimism. With alcoholism, the concept of the incurable skid row derelict has given way to recognition in the latter half of the 20th century that many alcoholics achieve long periods of abstinence, sometimes enduring for a lifetime. In this report, we shall attempt to identify the major features of substance abuse careers, with emphasis on relapse and recovery. We shall concentrate on the use of alcohol and opioids because use and abuse of these two psychoactive substances have been studied intensively. Less information is available about the long-term careers of persons who use tobacco, marijuana, cocaine, and other commonly abused substances. While we shall mainly describe patterns of behavior, we shall also comment on theory, for data without theory have restricted meaning. We draw on three theoretical aproaches which have served to integrate and explain observations about substance abuse: 1) pharmacological theory--concepts about the interaction of exogenous substances with body tissues and organs, especially with the central nervous system; 2) learning theory--especially the paradigms of classical conditioning and operant conditioning; and 3) psychodynamic theory--concepts developed from exploration of subjective mental experience. In psychodynamic theory, it is assumed that past experience shapes current behavior--that is, antecedent experience has persisting consequences. This etiological assumption probably pervades most contemporary psychosocial science. Psychodynamic clinicians and psychosocial scientists also seem to assume that current circumstances affect behavior. Some clinicians and scientists also find etiology in the anticipated future. Personal goals and plans seem to affect current behavior. Thus, in a broadly conceived psychodyanmic theory, stored representations of past experience, perceptions of current circumstances, and anticipated future experience contain potential etiological factors.

DEFINITIONS

The absence of generally accepted criteria for different levels of substance use--for abuse, for dependence, for relapse, and for recovery--have required that investigators develop definitions and criteria based primarily on their own research questions and methods. These varied criteria, plus variations in methodology, have contributed to wide variations in reported recovery and relapse rates, and have handicapped comparison of the findings of different studies.

While the advent of the third edition of the Diagnostic and Statistical Manual of Mental Disorders, DSM-III (American Psychatric Association 1980), has provided standard criteria for diagnosis of substance use disorders, the rubrics include wide variation in severity of the disorders. The Manual does not provide criteria for recovery.

In this chapter we use the term "opioid" to refer to any substance of natural or synthetic origin which has morphinelike effects. Occasionally, when citing the work of others, we use the older term "narcotic" in a sense approximately synonymous with "opioids."

The term "dependence" unfortunately has some ambiguity, for two meanings are ascribed to it. The term is used to refer to an altered physiological state due to continued use of a substance, and it is also used to refer to behavior--that is, to regular compulsive use. When we refer to the altered physiological state, we use the expression, "physical dependence." We use substance "dependence" in accordance with DSM-III criteria, and consider it approximately synonymous with the older term, "addiction." We use the term "addiction" occasionally in citing the work of others who use this term.

We use the term "alcoholism" in a broad sense to include not only alcohol abuse and alcohol dependence, but also problem drinking which may not meet the DSM-III criteria for abuse or dependence.

The term "abstinence" also has two meanings. It is used to refer to the abstinence syndrome, a disorder which follows cessation of use when physical dependence on a substance exists, and also to refer to a continuing state of abstaining from substance use. We use "withdrawal" (the DSM-III term) to refer to the abstinence syndrome, reserving abstinence to refer to the continuing drug-free state.

ANTECEDENTS OF SUBSTANCE ABUSE

Because conditions preceding and contributing to the onset of substance abuse may also have a role in relapse, we note here several factors thought to have etiological importance in the onset of substance abuse.

An antecedent personal vulnerability seems an important etiological condition for alcohol dependence and opioid dependence. Only a small proportion of persons who use these substances become compulsive users. Accumulating evidence points to a genetic factor in alcoholism (Goodwin 1979), and there is somewhat less evidence in opioid dependence. Rats have been selectively bred for susceptibility to morphine addiction (Nichols and Hsiao 1967). Evidence of a heritable influence in tobacco use has also been offered (McClearn 1983). In our study (Maddux and Desmond 1981) of opioid use careers we found a high prevalence of substance abuse among relatives of our subjects. Twenty-eight percent of the fathers were considered alcoholic, and 37% of the subjects had one or more opioid-using siblings; we do not know whether genetic inheritance or social learning accounts for these high rates of substance abuse in the families of our subjects.

Adverse childhood experience has been implicated as a contributor to alcoholism vulnerability in both retrospective and prospective studies (Vaillant 1983), but in Vaillant's own prospective studies, adverse childhood experience did not predict alcoholism, with the exception that having one or two alcoholic parents predicted alcoholism. In this latter case, the effect of genetic inheritance becomes confounded with that of environment. Vaillant also found that origin in an ethnic group that tolerated adult alcoholism but discouraged children from learning safe drinking practices also predicted alcoholism.

Clinical and other retrospective studies (Chein et al. 1964; Craig and Brown 1975; Seldin 1972) have implicated adverse childhood experience in the etiology of opioid dependence. Prospective studies starting with children before the onset of opioid dependence have not been reported. In retrospective study of the childhood experience of our subjects, we found ample evidence of adverse experience, but when we compared the parental family experience of 50 addicts with their nonaddict brothers, we did not find noteworthy difference (Maddux and Desmond 1984). We should note, however, that almost 50% of the nonaddict brothers had histories of alcohol abuse.

Retrospective studies have indicated that alcoholics began their drinking to decrease tension, anxiety, or depression (Jellinek 1960). Relief of chronic emotional distress may serve as the consequence which reinforces alcohol use. Vaillant (1983) did not find evidence of more emotional distress existing premorbidly among alcoholics than among nonalcoholics. However, he did find that alcoholics were more likely to be premorbidly antisocial than nonalcoholics. Since antisocial behavior often conceals anxiety or depression (Vaillant 1975), hidden emotional distress may have existed abundantly in his pre-alcoholic subjects.

Clinical studies have also indicated that opioid users began their repeated opioid use to relieve chronic emotional distress (Wikler and Rasor 1953; Khantzian et al. 1974; Wurmser 1974; Khantzian 1985). While few of our subjects gave histories of chronic emotional distress, the majority showed evidence of antisocial behavior preceding opioid use. On several measures of early deviant behavior, 50 of our subjects were significantly more deviant than their nonaddicted brothers (Maddux and Desmond 1984). Our opioid users as well as Vaillant's alcoholics may have concealed their emotional distress in their antisocial behavior before the onset of the substance use disorder.

CHRONICITY AND RELAPSE

Although chronicity of alcohol abuse has probably been observed for centuries, biblical and other ancient reports seem to comment more on the excesses and failures of the drunkard rather than on the chronicity of the condition. Austin (1979) cited a law enacted in 1672 in Plymouth, Massachusetts, which stated that alcohol misuse was a chronic condition among certain drunkards. Jellinek (1960, p. 220) noted a 19th century report on the danger of relapse after cure. While Jellinek was primarily concerned with the concept of alcoholism as a "disease," his descriptions of the types of alcoholism note both its chronicity and periodicity.

While opium has been known and used for many centuries, the problems of chronic compulsive use and relapse after a period of abstinence did not become identified until the 19th century. In his "Confessions of an English Opium Eater," initially written in 1821, De Quincey (1966) first described the seemingly uncontrollable compulsion to continue using opium. He had multiple periods of abstinence followed by relapse. When he revised the Confessions for the last time at age 71, he had struggled unsuccessfully with his laudanum habit for 52 years.

Jones (1953) chronicled a similar lifelong struggle with tobacco dependence in his biography of Sigmund Freud. Recognition of compulsive smoking as an addiction or chronic disease was slow to develop (Jaffe 1977). Tobacco dependence did not enter the official diagnostic nomenclature of the American Psychiatric Association until 1980. In the DSM-III the course of the disorder was described as "variable," with some individuals repeatedly attempting to give up tobacco without success, and others able to achieve total cessation after a relatively brief episode. Relapse was alleged to be unlikely among persons who achieved a year or more of abstinence. Russell, in a review of mostly British studies (1971), reached a more pessimistic conclusion, asserting that "as many as three out of four smokers wish to or have tried to stop their smoking, but less than one in four ever succeeds in becoming a permanent ex-smoker" (Russell 1971, p. 3).

VARIABILITY IN SUBSTANCE ABUSE CAREERS

Psychoactive substance use seems to vary in adult populations not only by the substance used and by the number of substances used, sequentially or concurrently, but also as a continuum of severity. This continuum ranges from no use, to nonproblem personal or social use, to episodic or continuous problem use, to dependence with inability to abstain, and finally to death as a direct or indirect consequence of the substance use. The substances used and the severity vary not only from person to person, but over time in a given person.

Jellinek (1960) described different levels of severity of alcoholism and labeled these alpha, beta, gamma, delta, and epsilon. Delta alcoholism was the most severe level; it included both physical dependence and inability to abstain. Jellinek considered alcoholism a progressive disease, but he did not describe the long-term alcoholic career. Vaillant (1983) has offered the major contemporary contribution in this area. His book not only presents the findings from three prospective longitudinal studies conducted by Vaillant and his colleagues; it also summarizes the major preceding longitudinal studies and followup studies. Alcoholism becomes a progressive disease in only a minority of alcohol abusers. Some heavy drinkers on occasions will develop problems which meet the DSM-III criteria for alcohol abuse but will progress no further; some of these return to social drinking. Among those whose drinking comes to meet the diagnostic criteria for alcohol dependence, the course also becomes variable: they have successive periods of abstinence, of social drinking, and of relapse to alcohol dependence. The periods of abstinence are often introduced by treatment or by participation in Alcoholics Anonymous. Alcohol dependence commonly leads either to prolonged abstinence or to social incapacity or death.

Like the course of alcohol dependence, the course of opioid dependence also varies greatly. In addition to irregular periods of abstinence, occasional use, daily use, and treatment, the modern opioid user often has long periods of incarceration. Since 1966, my colleagues and I have been engaged in a prospective followup study of 248 opioid users who resided in San Antonio. The findings in this study illustrate the variable nature of opioid use careers. The subjects, all men, were hospitalized at the former Public Health Service Hospital in Fort Worth, Texas. Their mean age in 1966 was 28, and, if all were alive, it would have been 47 in 1985. Fifty-three (21%) have died. The methods and preliminary findings of the study have been published (Maddux and Desmond 1981).

Figure 1 shows the marked variations in the 20-year opioid use careers of ten subjects. Subject 071 used heroin daily for approximately two years, then served 18 months of a five-year prison sentence as a patient at the Public Health Service Hospital. Aged 29 when paroled, he remained abstinent from opioids for 10 years, through age 39 at the time of our last interview. Subject 067, in marked contrast, remained dependent on heroin or methadone during most of his adult life, although he did have several periods of voluntary abstinence lasting three to 14

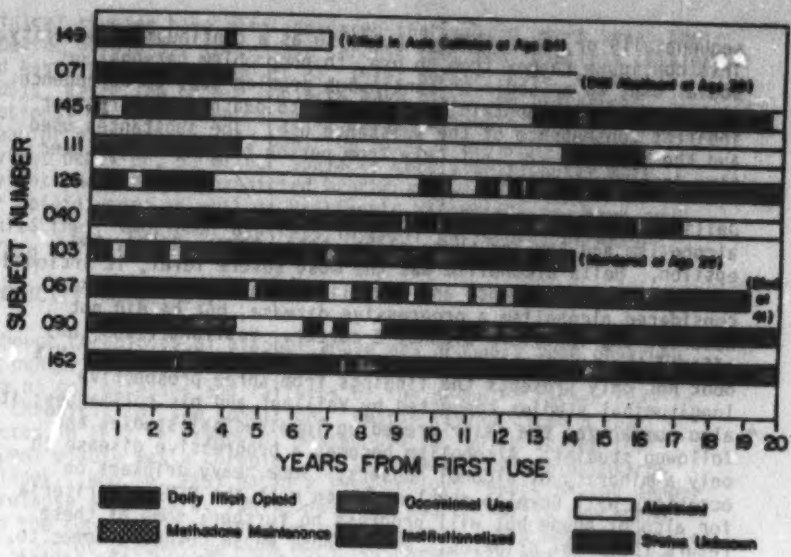

FIGURE 1

Substance use careers of ten San Antonio opioid users. (Maddux and Desmond 1981.) Copyright 1981, Praeger Publishers.

months. The longest period of abstinence occurred while he was working for a defense contractor overseas, away from his usual source of drugs. He died in a hospital at age 41 following surgery for peptic ulcer.

Similar variability probably exists in the long-term tobacco use career, but studies of tobacco use patterns over two years or longer are uncommon (Schwartz 1977; Krasnegor 1979), and mention of the concept of career in the context of tobacco use disorder is rare. Our review of the literature turned up only one reference to a "tobacco use career" (Kozlowski 1979).

RELAPSE AFTER TREATMENT

The majority of treated alcoholics relapse to alcohol abuse or dependence. Vaillant (1983, p. 284) pooled the results of four studies in which a total of 685 treated alcoholics were followed for two years. At the end of two years 63% were abusing alcohol; 21% were abstinent or drinking socially. In Vaillant's own sample at the end of two years, 67% were abusing alcohol; 20% were abstinent or drinking socially. By the end of the eight-year followup period, 95% had resumed drinking at some time, but not all had relapsed to alcohol abuse or dependence.

Relapse not only occurs frequently after treatment, it also occurs rapidly after treatment. Gottheil and associates (1982) reported that only 19% of 20 treated alcoholics remained abstinent during six months after treatment; 48% became relapsed drinkers during that time. The authors cited two other studies, having a combined total of 499 treated alcoholics, in which only 18% remained abstinent during six months after treatment.

Frequent and rapid relapse after treatment also occurs in opioid dependence. Duvall et al. (1963) found that 97% of 43 opioid users became readdicted at some time during five years of followup after treatment. An estimated 67% became readdicted during the first six months after discharge. In our study (Maddux and Desmond 1981) of careers of opioid users, we found that 70% of 1,653 treatment and correctional interactions over a mean period of 20 years were followed by less than one month of abstinence. Eighty-seven percent were followed by abstinence of less than six months. In their followup of 2,099 opioid addicts in the Drug Abuse Reporting Program, Simpson and Sells (1982) reported that 56% to 77% of opioid addicts in different treatment groups resumed opioid use within one year after completion of treatment.

Frequent and rapid relapse has also been reported following treatment of tobacco dependence. Hunt et al. (1971) plotted relapse curves of treated alcoholics, heroin addicts, and smokers and found the three to be essentially the same. In their reviews of smoking treatment outcomes, Hunt and Bespalec (1974) and Krasnegor (1979) concluded that most smokers, 70% to 80%, resumed tobacco use within one year. Hall and associates (1984) more recently reported a lower relapse rate following treatment with a relapse prevention component.

Vaillant (1983, p. 180) identified five factors which he considered important in relapse to alcoholism. Two of these were factors which also made the person vulnerable before the onset of alcoholism. The five factors included: 1) a genetic predisposition; 2) a psychological predisposition; 3) physical dependence, which may persist for months after abstinence; 4) operant and Pavlovian conditioning; and 5) absence of protective conditions, such as a stable social network.

Nearly 50 years ago Kolb (1927) identified three factors which he considered important in relapse to opioid dependence: 1) a primary psychic factors, which made the person vulnerable to the original opioid dependence and to relapse after abstinence; 2) physical dependence--Kolb felt that his factor became more important with increasing years of opioid use; some of his subjects who were addicted 10 or more years reported feelings of lassitude and undue fatigue which lasted six to nine months after cure; 3) memory associations and habit. The repeated relief of discomfort by taking morphine or heroin formed a strong association between physical and mental distress and the taking of the drug.

While Kolb reported environmental adversities which seemed to precipitate relapse, he attributed more importance to the person's inability to cope, i.e., the primary psychic factor.

Since Kolb's report, protracted withdrawal existing for six months following opioid dependence has been measured and described, and its possible role in relapse has been assessed (Martin 1972). Thus, in both alcohol and opioid dependence, protracted withdrawal seems a likely etiological factor in rapid relapse. Withdrawal may also be a factor in relapse to tobacco dependence (Pomerleau 1979; Shiffman 1979).

The "memory associations and habit" conceived by Kolb have been reformulated into classical and operant conditioning hypotheses. Both tpyes of conditioning have been demonstrated (mainly in rats) to have roles in relapse (Wikler 1980).

In our study of careers of opioid users, we attributed relapse in part to protacted withdrawal, to conditioning, and to stress, such as the onset of marital conflict. Additionally, we inferred a subjective motivational state revealed more in action than in words. Our subjects came to most treatment interactions under external coercion, and they rarely seemed to have a desire persistent enough to overcome their opioid dependence.

Many factors associated with relapse to tobacco dependence have been identified. Prominent ones include the "overlearned" nature of the habit (Hunt and Matarazzo 1970); withdrawal discomfort (Schachter 1970; Jarvik 1970); use of other substances, particularly alcohol (Shiffman 1982); social pressures (Marlatt and George 1984); negative affect (anxiety, tension, and depression) (Kozlowski 1979; Shiffman 1982); and deficient coping skills (Hall et al. 1984; Marlatt and George 1984).

LONG-TERM OUTCOMES

The studies which have followed substance abusers for five years or longer seem almost entirely limited to studies of alcohol and opioid users. We found only one five-year followup study of smokers (West et al. 1977). All studies found that small percentages of subjects were abstinent at varying followup periods.

Kendell and Staton (1966) followed a group of 62 British alcohol addicts for an average of 6.7 years after they rejected or were denied admission to treatment. At followup, 18% had died, 8% had returned to "normal social drinking," and 15% had been abstinent at least one year (mean duration was approximately four years) at followup. Only one of the nine abstinent subjects received no treatment during the followup.

Hyman (1976) studied a group of 54 New Jersey alcoholics, aged 30 to 54 at admission to treatment, for a period of 15 years from termination of treatment. At followup, 33% had died, 17% were "unimproved problem drinkers," 20 were moderate drinkers, and 11%

were total abstainers for a period of a least three years before followup. Nineteen percent could not be located or refused to participate.

Edwards et al. (1983) studied 99 married alcoholic men for an average period of 11 years. Eighteen had died, 13 were lost to followup, and 68 were personally interviwed. We recomputed the published outcome status statistics by using the starting sample of 99 as the denominator. At followup, 27% were "doing well," 32% were drinking in an "uncontrolled fashion," 9% were in a category labeled "equivocal outcome," 18% were dead, and 13% were unknown. In their summary, Edwards and associates noted that "Pathways to recovery are individual and complex," and that an important final path may be ". . . certain psychological shifts." Data from the Edwards study were reanalyzed by Taylor and associates (1985). Approximately 25% of the subjects alive throughout the ten-year study period were continuous drinkers, and 15% were continuously abstinent. The remaining 60% exhibited a patchwork of abstinence and troubled drinking; in other words, most experienced multiple periods of remission followed by relapse.

Vaillant and Milofsky (1982) reported that among 110 alcohol abusers followed from age 20 to age 47, 21 (19%) became "securely abstinent," i.e., had achieved three years or more of continuous abstinence--actually, a mean of 10 years. Some of the most symptomatic drinkers were among those who achieved secure abstinence.

Although alcoholism occurs with demonstrated severity and frequency among Native Americans, a 10-year followup by Westermeyer and Peake (1983) suggested long-term outcomes similar to those cited above. At the time of followup, the 45 subjects were found in the following statuses: abstinent for two years or more, 16%; problem drinking, 58%; dead, 20%; and unknown, 7%.

The long-term followup studies of opioid addicts have also found small percentages abstinent at different periods of followup. In their followup of 453 opioid addicts, Duvall et al. (1963) found that, at five years after followup, 46% of living subjects were addicted, 2% were voluntarily abstinent, and 24% were involuntarily abstinent.

In his study of Kentucky opioid addicts, O'Donnell (1969) described the careers of 266 subjects during an average period of 12 years after their first admission to the Public Health Service Hospital in Lexington. He found that 13% of the subjects displayed "much abstinence" (more than 50% of noninstitutional time), and 10% displayed "complete abstinence" after treatment. Thirty percent were addicted throughout their posthospital careers. O'Donnell emphasized the general lack of clear-cut longitudinal patterns, noting that 60% of the subjects were "seen to shift from one status to another, with periods of narcotic addiction broken by shifts to other drugs, and frequently by periods of complete abstinence, sometimes quite long."

Vaillant's followup studies of New York City heroin addicts are perhaps the most widely cited addiction career studies. In both his 12-year followup (1966a, 1966b) and his 20-year followup (1973), Vaillant emphasized a three-year abstinence criterion: ". . . urban heroin addicts who achieve more than three years of abstinence can usually maintain this abstinence indefinitely." Of 100 addicts admitted to treatment in 1952, 23% had died by 1970, 35% had achieved what he called stable abstinence, and 25% were still using opioid drugs.

Vaillant's 20-year followup depended primarily on institutional records. Most of the followup studies of British opioid addicts (Gordon 1983; Cottrell et al. 1985; Willis and Osbourne 1978) suffer from the same methodological problem. Other followup studies have relied primarily on self-reports from subjects, with variable confirming data from other sources. The validity of data obtained in followup studies represents a continuing problem.

In our study of 248 opioid users from San Antonio, we learned that a three-year abstinence does not portend a lifetime abstinence. In 1981 we reported that 33% of our subjects who achieved three or more years of abstinence eventually resumed opioid use (Maddux and Desmond 1981, p. 101). By the end of 1983, 31 subjects had achieved five years or more of opioid abstinence during their careers but had later resumed daily use. Of these 31, 12 subjects (39%) resumed opioid use after periods of abstinence ranging from five to nine years, and one subject resumed opioid use after 13 years of abstinence.

Ninety-three of our 248 addicts began opioid use in 1954 or before and were followed either until death or through calendar year 1984. In figure 2 are shown the percentages of subjects in different drug use statuses during July of each year from the year of first use through the 30th year after first use. The percentage of subjects in each status is represented by the width of the horizontal bands. Individual subjects shifted among these statuses over time. For more than 20 years, the percentage of subjects using illicit opioids daily remained approximately 40%. The percentage abstinent during the first two decades ranged from 7% in year 1 to 24% in year 4. The main changes during these two decades were the decrease in occasional use, which was most marked in the first three years, and the large increase in percentage institutionalized, which peaked in year 12. After the 20-year mark a steady decline in daily illicit opioid use began, along with a noticeable decrease in institutionalization. By July of year 30, only two subjects were using heroin daily and 11 were maintained on methadone. Twenty (22%) died by the 30th year.

In the 30th year after initial use, 14 (15%) of the 93 subjects had three years or more of continuous voluntary abstinence from opioids, no evidence of alcohol or nonopioid drug abuse or dependence, full-time employment of three years duration, and no arrests for at least three years. The mean duration of abstinence in this recovered group was eight years as of the 30th career

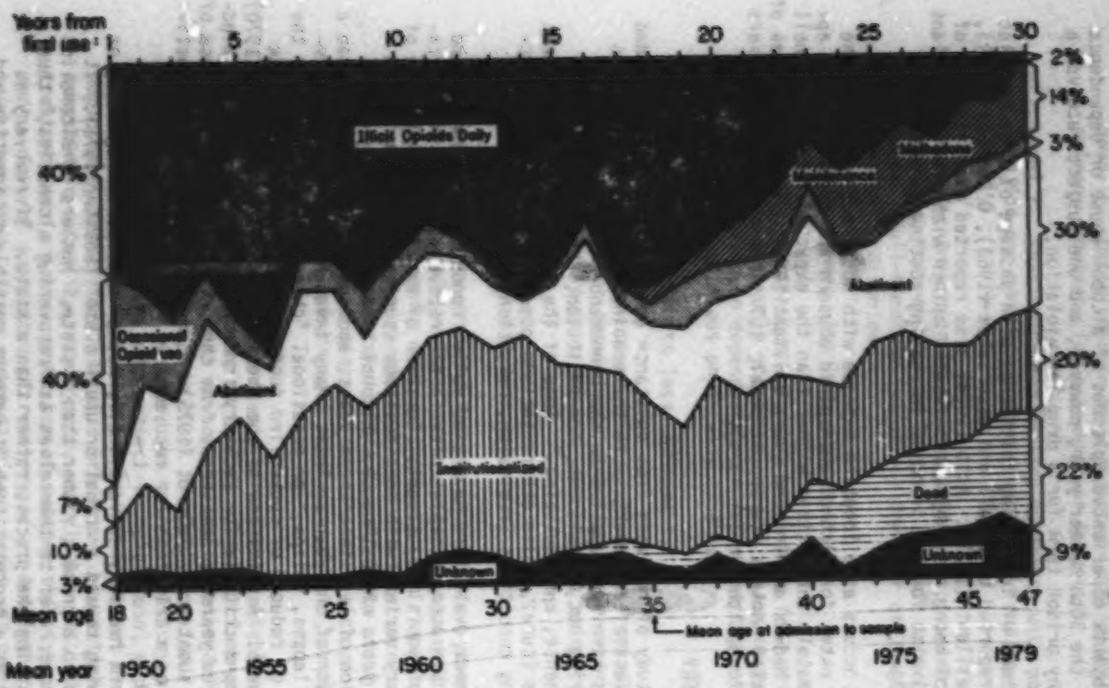

FIGURE 2.

Drug use status of 93 San Antonio subjects during July of years 1-30 after onset of opioid use.

year. We have continued to follow the subjects beyond that point, however; and at the time of our most recent interview, these men had accrued an average of four additional years of abstinence, making a mean of 12 years of continuous abstinence. Four of the 14 subjects experienced episodes of alcohol abuse or dependence after the 30th career year, however, and one subject received a lengthy prison term for a drug law violation.

The trend of increasing abstinence with passage of time has also been reported by Duvall and associates (1963), O'Donnell (1969), and Vaillant (1973). Kolb (1924) also reported excessive use of alcohol among his subjects following opioid withdrawal. Vaillant (1983) also found a trend of increasing abstinence among his alcholics.

Death occurs as a longterm outcome with notable frequency. The death rates for alcohol and opioid abusers are reported to be approximately three times higher than the expected rates (O'Donnell 1969; Maddux and Desmond 1981; Vaillant 1983). The death rates of cigarette smokers are approximately 1.7 times those of nonsmokers (Public Health Service 1979).

RECOVERY

The study of recovery from substance dependence has been impeded by a lack of agreement as to the meaning of the term. Diverse labels have been applied to the phenomenon, including "cure," "maturing out," remission, "de-addiction," cessation, stable abstinence, and "quitting." Some of the terms imply a permanent status (cure), while others include possibly temporary or fluctuating conditions (remission, cessation).

Treatment evaluators have used varied concepts of recovery, and they have used multiple criteria for recovery, including indicators of social adjustment. Duration of abstinence suggestive of recovery varies, with most followup studies specifying one to three years of abstinence. Alcohol studies frequently use a duration of less than three years, and most smoking studies use a duration of one year or less. Many investigators ignore infrequent lapses, "slips," or occasional "chipping." Debate over the issue of reduced or controlled substance use versus abstinence continues. A committee of the American Medical Association (1970) developed criteria for recovery from drug dependence which included three years of abstinence from the primary drug and no abuse of other substance. Bejerot (1975) recommended five years of abstinence as a criterion for recovery.

The term recovery conventionally means "the act of regaining or returning toward a normal or usual state" (Webster 1971). It refers to a process rather than a state. Members of Alcoholics Anonymous refer to themselves as "recovering alcoholics," thus emphasizing the process rather than a state. If recovery is viewed as a process, then it becomes possible to identify and describe, more or less arbitrarily, levels in the process. Levels such as the following could be defined:

Level 0. Continued daily use of primary substance for one month or longer, or incarcerated, for one month or longer.

Level 1. Daily substitute medication (e.g. methadone) for primary substance for one month or longer.

Level 2. Abstinent from primary substance with no substitution for one month or longer. Recovered from acute withdrawal.

Level 3a. Only occasional nonproblem use of primary or other substance for one year or longer. Possible tobacco dependence. Full-time employment for one year or longer unless physically disabled.

Level 3b. Same, with less employment.

Level 4a. Continuous voluntary abstinence from primary substance with only occasional use of other substances. Possible tobacco dependence. Full-time employment for one year or more unless physically disabled.

Level 4b. Same, with less employment.

Level 5a. Continuous voluntary abstinence from all substances, except possibly tobacco, for one year or more. Full-time employment for one year or more unless physically disabled.

Level 5b. Same, with less employment.

The levels could be extended for two years, three years, or longer. The use of levels of recovery avoids the difficulty of attempting to determine whether the person has regained a "normal or usual state." The person who has had a substance use disorder may never completely return to his "usual" state which preceded the disorder. Some remnants of the disorder, such as the loss of liver cells or the memories of substance effects, probably endure for a lifetime.

Several studies have identified pretreatment variables which predicted recovery. Among alcoholics, these include social stability--especially with respect to employment and family; absence of arrests, and late onset of alcoholism (Vaillant 1983, p. 168). Among opioid addicts, the criminal history predicted posttreatment outcomes with respect to opioid use, employment, and criminality (Simpson and Sells 1982). Pretreatment criminality, employment, and alcohol use also predicted, respectively, posttreatment criminality, employment, and alcohol use. Duration of treatment was a better predictor of outcome than type of treatment. Several predictors of recovery after smoking treatment have been identified. Among older studies, gender was one of the most powerful; women consistently had more difficulty quitting (Kozlowski 1970). Among men, high extraversion and low neuroticism predicted good outcome. Other predictors included lower pretreatment cigarette consumption, low use of other substances--particularly alcohol and caffeine, having fewer relatives and friends who smoke, lower levels of chronic illness, and absence of "negative affect" smoking (Schwartz 1977; Kozlowski 1979).

In our study of opioid use careers, we found several background variables that were weak but statistically significant predictors of years of abstinence during the first 10 years after first opioid use. These included intact parental family, no opioid-using relative, no convictions before first opioid use, number of months from first use to daily use, and age at first daily use. These findings suggest that a better family background leads to better coping skills and less alienation, and these in turn lead to less deviant behavior and later onset of daily use; the combination then leads to a somewhat less severe opioid use career. These predictor variables account for only 18% of the variance in years abstinent.

Other studies which have focused on the relationship of both pretreatment and treatment variables to long-term outcome have typically found that the predictor variables explained only a small fraction of the outcome variance (Zahn and Ball 1972; Whitman et al. 1982; Judson and Goldstine 1982; Simpson et al. 1982). These findings, together with the recognition that formal treatment only initiates the recovery process (Edwards 1984; Pechanek 1979; Wille 1980), have prompted some investigators to look more closely at posttreatment variables. Many substance-dependent persons begin recovery without treatment (Drew 1968; Robins et al. 1980; Schacter 1982); study of spontaneous recovery is frequently advocated (Vaillant 1983; Smart 1976; Waldorf and Biernacki 1979).

Substance substitution occurs with noteworthy frequency, especially between alcohol and opioids. Thirty-nine percent of Kolb's (1924) opioid users were alcoholic before they began opioid use. This pattern seems less common in the latter half of the 20th century, yet a substantial minority (25% to 30%) of opioid users continue to report alcohol abuse or dependence pre-dating onset of opioid dependence (Green et al. 1978) or prior to treatment (Barr and Cohen 1980). O'Donnell (1969) observed substitution of alcohol and barbiturates among his Kentucky addicts who had ceased opioid use. Vaillant (1966b) found a substitute substance dependence, usually alcohol, among some of his abstinent former heroin addicts. Among his abstinent alcoholics, he also found substance substitution (Vaillant 1983). The substituted substances included benzodiazepines, marijuana, and tobacco. Waldorf (1983) reported "heavy drinking" among 41% of 201 recovered addicts, but suggested that this phenomenon occurred early in the recovery process and abated within a year. In our career study, we found that 43% of 54 subjects who achieved three years or longer of opioid abstinence had substituted alcohol for the opioid drug. Most exhibited evidence of alcohol abuse or dependence for more than one year.

A large minority of patients maintained on methadone drink excessively (Joseph and Appel 1985). Apparently, many opioid users cannot endure a steady pharmacological state, neither abstinence nor smooth maintenance. Furthermore, from our clinical observation, it seems that most opioid addicts in treatment smoke one or two packs of cigarettes every day. The alcohol and tobacco use by methadone patients seems to be substance supplementation rather than a substitution.

Several investigators have identified and described a number of posttreatment conditions which were thought to facilitate prolonged abstinence or recovery. O'Donnell (1969) found that abstinence from opioids was weakly associated with several variables: gender (women were more frequently abstinent than men), less involvement in the drug subculture, and being employed regularly. The associations were statistically significant, but were not strong enough to be considered practical predictors of abstinence. One environmental factor was of such overriding importance that the other variables had little chance to show an effect. That major factor was decreased availability of opioid drugs. O'Donnell's subjects lived in a locale and an era in which marked changes in medical prescribing practices, enforcement of narcotics laws, and other social factors acted together to drastically reduce the amount of opioid drugs available.

Vaillant (1966b) reported the following factors associated with opioid abstinence: compulsory supervision, a stable nonparental personal relationship, and a change in residence away from the drug-use area. He reported different but overlaping factors associated with abstinence after alcoholism (Vaillant 1983): behavior modification (broadly conceived to include compulsory supervision), enhanced hope and self-esteem (often from religion or AA), and social rehabilitation (including a new love relationship). He commented (p. 314) that "Staying sober is not a process of simply becoming detoxified, but often becomes a work of several years or . . . a lifetime."

Brill (1972) conceived a transition to addiction and the transition to abstinence as processes that evolved slowly with much learning and adaptation. He called factors associated with recovery "pushes" and "pulls." The pushes included: the bad life, including arrests, prison, and hospitalization; negative self-image; overdose; stress from constantly avoiding withdrawal; and exhaustion of resources. The pulls included: legitimate aspirations; treatment; personal relationships; and opportunity to think while in jail or hospital.

Waldorf (1983) identified five processes (excluding development of alcoholism or other psychiatric disorders) leading to recovery in samples of 100 treated and 101 untreated ex-addicts: 1) developmental change; 2) conversion to religious, spiritual, or ideological groups; 3) change in behavior following environmental change; 4) "retirement" from drug use; and 5) "drift" from deviant into conventional behavior.

Among our 54 former addicts who achieved three or more years of abstinence, we identified the following factors (excluding alcohol substitution) which probably facilitated the abstinence: treatment or correctional interaction during year before onset of abstinence (present in 89% of the cases); relocation of residence away from usual source of drugs; evangelical religious participation; employment with a drug abuse treatment agency; and probation or parole for one year or longer (Maddux and Desmond 1981, pp. 99-105). Our later, more extensive analysis of residence relocation demonstrated this factor to be significantly associated with abstinence (Maddux and Desmond 1982).

The following three vignettes illustrate factors associated with recovery among our San Antonio subjects. The careers of the three men are depicted in figure 1.

Subject 071. After approximately two years of heroin use, he spent 18 months in involuntary treatment. After release from treatment, he planned to resume heroin use, but, as he was preparing the heroin for injection, he realized that he had life goals which were incompatible with heroin use. He wanted to take care of his family and set a good example for his children, and he wanted to accomplish something in life. He refused the injection and remained abstinent for 15 years, through the age of 44 at last interview.

Subject 111. After four years of occasional use of heroin he ceased use because he married and his wife promptly threatened to leave if he used heroin. Nine years later he resumed use in response to marital conflict, used daily for two years, and then voluntarily entered a hospital for treatment. After treatment he became intensely involved in church work. Aged 47 when last interviewed, he was no longer involved in his church work but had been abstinent and steadily employed for 18 years.

Subject 162. From age 16, he used heroin daily for 20 years, except for short periods in hospital or jail. Then, at age 37, while participating in a prison therapeutic community, he felt a change in himself. He decided to stop "playing games." After discharge (not shown in figure 1), he remained abstinent under compulsory supervision and obtained employment in a drug abuse treatment program. When last interviewed, at age 52, he had been abstinent for 14 years.

The following factors were cited in two or more of the studies reviewed above: compulsory supervision, residence relocation, a supportive social environment, religious activity, and treatment.

THE MAJOR THEMES

Similar findings by different investigators on several general features of substance abuse careers in the United States, especially those of alcohol and opioid users, have emerged in our review of the literature. These can be summarized as major themes, as follows:

1. Personal vulnerability. Only a small proportion of persons who use psychoactive substances become substance abusers. Some persons use alcohol throughout a lifetime without disability. A special vulnerability, genetic or acquired, seems important in the etiology of alcohol and opioids abuse and in relapse. The evidence for personal vulnerability seems less clear for tobacco dependence.

2. High risk environment. Increased accessibility of substances seems to be another important etiological factor. The much greater prevalence of alcohol abuse over opioid abuse may be a consequence of increased availability, the difference due to the greater legal control of opioids. Furthermore, considerable evidence points to factors in the family and social environment, especially those promoting social learning of substance abuse.

3. Wide variation. Substance abuse careers vary widely in duration and severity. Most alcohol and opioid abusers show irregular periods of abuse, abstinence, ocasional use, daily non-abusive use, hospitalization and outpatient treatment, and, especially with opioid uses, incarceration. Less is known about the tobacco user's career.

4. Substance substitution. Substitution of alcohol abuse for opioid abuse and the reverse occurs with noteworthy frequency. Concurrent, supplementary use of one while abusing the other also occurs. Tobacco dependence is seen with high frequency among both alcohol and opioid abusers.

5. High mortality. Death rates for alcohol and opioid abusers are approximately three times higher than expected rates. Death rates of smokers are 1.7 times higher than those of nonsmokers.

6. Frequent and rapid relapse. Alcohol dependence, opioid dependence, and tobacco dependence often seem refractory to treatment. Most treated persons relapse within one year after treatment.

7. Increasing abstinence. With passage of years, increasing abstinence is found in alcohol dependence and opioid dependence. This also probably occurs in tobacco dependence, but long-term career studies of this disorder have not yet been reported.

8. Maintaining recovery. The minority of alcohol and opioid abusers who maintain a recovery process for three years or longer seem to experience personal change with less emotional distress. Environmental conditions such as treatment to initiate and maintain the recovery, external coercion, and supportive social relationships seem useful in maintaining the recovery.

ISSUES

Although general themes of agreement seem to exist about the characteristics of relapse and recovery in substance abuse, several problems handicap understanding of these phenomena. The problems include:

1. *Definitions and criteria*. The absence of generally accepted criteria for relapse and recovery handicap comparison of results of outcome studies.

2. *Clarification and measurement of etiological factors*. While a number of individual and environmental factors have been identified which seem to affect relapse and recovery, the conceptions of these conditions vary among investigators. More research is needed to clarify and measure these variables and to estimate their effects.

3. *Motivation for recovery*. Most alcohol and opioid abusers enter treatment under external coercion. Alcohol abusers often deny that they have an alcohol problem. Motivation for recovery, a subjective changing condition, seems a prominent determinant of the recovery process. More precise analysis and measurement of this condition is needed.

4. *Social drinking*. Return to "social" or "controlled" drinking or drug use as a level of recovery needs further study and evaluation.

5. *Treatment effects*. While treatment seems to have beneficial short-term effects, especially partial or complete recovery from acute withdrawal, its effects on the long-term career seem less clear. More study is needed.

6. *Validity of data*. Most of the data of followup and career studies consist of self-reports from subjects. While urine analyses and reports from other sources generally tend to confirm the self-reports, continued study on the validity of self-reported recovery from substance abuse subjects is needed.

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ACKNOWLEDGMENT

This work was supported in part by the U.S. Public Health Service Service grant number DA 00083 from the National Institute on Drug Abuse.

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Multivariate Description of Alcoholism Careers: A 10-Year Followup

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INTRODUCTION

This chapter presents data collected by a team of workers at the Addiction Research Unit in one of its longest standing studies. By 1971, this team had inducted 99 male, married alcoholics attending the Maudsley Out-Patient Clinic into a treatment trial in which the standard treatment program was compared with the efficacy of just giving simple advice (Edwards et al. 1977). Recently, these alcoholics were contacted again, 10 years or more later, and it is this set of data with which this chapter is concerned. A number of reports on this project have already been published (Edwards et al. 1983, 1986; Duckitt et al. 1985; Taylor et al. 1985.)

The data obtained for these patients does not detail their relapses and recoveries throughout the period of the followup. It is intended to give an overview of the processes of change that occurred over those 10 years and show the background against which the careers of these alcoholics have unfolded. In so doing, the aim of this primarily descriptive study is to supply the context within which the individual movements between relapse and abstinence might be understood.

Caution must be taken on interpreting too much and generalizing too far from these data, because of their inherent limitations: data limited in number to only 99 individuals; limited in time and place to London at the end of the 1960s; and limited to self-selected subjects, all of them married men, predominantly in their forties, seeking treatment as out-patients at the Maudsley Hospital clinic.

Nonetheless, we believe these data are important for what they can tell us: not just for the factual information they provide about these 99 alcoholics, but also because they raise issues of interest, both methodological and conceptual, that have a more general application. The larger questions the analysis raises about career and natural history of alcoholism are:

- What is the multidimensional structure of the phenomena which are subsumed under the simple term "outcome"?
- Does a maturation process exist and, if so, how should we characterise it?
- Should career be viewed as following distinct and different pathways, or is there a continuum of such patterns?

These questions are raised--but not answered--by this study. What has been attempted is (i) to chart periods of time spent in heavy drinking; (ii) to explore the relationship between the different dimensions of change; and (iii) to relate these to the severity of the alcohol problem at intake into the study 10 years previously.

THE BASIC SAMPLE DETAILS

The sample consists of 99 individuals who vary considerably in terms of career, natural history, and maturation, and are linked only in that the period for which we observed them began with an alcoholism clinic attendance at the beginning of the 1970s. They are not a birth cohort, their ages ranging at intake from 20 to 60. Neither are they a cohort at a particular stage of the development of their alcoholism: some had been previously treated for drinking problems but about 50 percent had not; and the extent of their drinking and dependence varied from moderately dependent drinking, with an intake of perhaps 5 pints of beer equivalent a day to more severely dependent individuals whose drinking was in excess of 20 pints a day.

TABLE 1

Selected Sample Characteristics at Intake into the Study

	Age at Intake				
	20-29	30-39	40-49	50-60	All
	16	28	35	20	99
Mean years of problem drinking(1):	1.7	3.5	4.5	8.1	4.4
Mean daily alcohol consumption(2):	286	291	248	217	259

(1) Years since "drinking became problem"
(2) On "typical drinking day" (in ml.)

Some of this background information is shown in table 1. Of these 99 men, 68 were interviewed at followup: 18 had died during the followup period, and 13 were lost to followup (including 1 refusal). Numbers in the subsequent analysis are reduced somewhat further by occasional missing items of data.

Table 2 shows in the broadest possible terms what happened to this group of alcoholics in respect to their drinking over the 10-year followup period. It gives year by year the average number of months the group as a whole spent in each of three modes of behaviour. Again, a previous publication (Taylor et al. 1985) displays these "life chart" data and reports more detailed information; but for our present purposes it will be sufficient to note that there is the gentlest of trends towards slightly more abstinence over time. This table, of course, pertains only to the 68 individuals for whom a followup interview was obtained.

TABLE 2

Drinking Status Data (in Months) During 10 Years of Followup of Interviewed Sample Members

	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81
Abstinent	4.0	4.1	4.0	4.4	4.2	4.7	4.9	5.4	5.3	5.1
Social	.2	.1	.4	.4	.5	.7	.7	.5	.8	1.1
Troubled	7.8	7.8	7.6	7.2	7.3	6.6	6.4	6.1	5.9	5.8

NOTE: Years are nominal and begin with first full calendar year of followup.

This report goes on to explore the separate patterns of behaviour and experiences which are contained within this summary presentation of the entire group. Our central theme is that the course of alcoholism requires a multivariate description. It cannot be confined to a simple record of drinking and abstinence: mental and social well-being are likely to vary from individual to individual, even when their drinking is similar; and apparently successful abstainers may well substitute for their drinking habits which are as bad or worse. Before proceeding, therefore, it is necessary to describe the data that have been collected for these individuals.

DERIVED MEASURES

The 68 individuals were interviewed using a semi-structured questionnaire with probing, and the interviews were tape-recorded. The interviewees were asked to give an account of their drinking history over the preceding 10 years. Only three categories of types of drinking were operationally defined, and the one with which we shall primarily be concerned here is that of "troubled drinking"--drinking more than five pints of beer in any day during the month or experiencing any dependence symptoms or experiencing other adverse consequences. (For full details of the definitions, see Duckitt et al. 1985.)

Apart from the tape-recorded accounts mentioned above, the principal item of information in this study which is coded on a year-by-year basis throughout the followup period is that of the drinking histories; this is the information from which the "life chart" data in table 2 was calculated. The remainder of the information is in the form of variables which in some sense summarise the entire 10 years of life of each individual. For example, the analyses presented here concern the total amount of time an individual spent in heavy drinking throughout the followup period and is a simple total across the years for the time-based drinking histories.

In addition to summarizing this 10-year interval, the study paid particular attention to behaviour during the 12 months immediately prior to followup. The information collected for this 1-year slice is not usually identical in form to the type of information collected for the entire followup. For example, the 1-year data on drinking is recorded as the total (estimated) consumption of alcohol over the past 12 months; this is in contrast to the followup data, which concern the amount of time spent in troubled drinking.

The data were collected in five designated areas of interest within which key questions were asked covering the entire follow-up, the 1-year period, or both, and for which summary scores were constructed:

(1) TOTAL 10-YEAR FOLLOWUP DRINKING & LAST YEAR CONSUMPTION

(2) TREATMENT - 10-YEAR FOLLOWUP & LAST YEAR
- Inpatient, Hostels, G.P.
- AA attendance

(3) PHYSICAL HEALTH - 10-YEAR FOLLOWUP
- Cirrhosis, Peptic ulcer,
  Alc. brain damage, Chronic illness

(4) MENTAL HEALTH - 10-YEAR FOLLOWUP & LAST YEAR
- Depression, Suicide, Drug problems

(5) SOCIAL ADJUSTMENT - LAST YEAR
- Employment, Stable home
- Legal encounters, Marriage

Ideally, each area would have been covered by a large number of questions in order to elicit detailed information for the whole field, but practical constraints determined that only a few key items could be elicited. The information under each heading is only outlined in this list; to give it in more detail here would be impossible and a discussion of the difficulties and advantages of constructing such scores would require a separate paper. (For some further details, see Duckitt et al. 1985.)

A further set of measures were taken at the followup point which consisted of a group of standard scales, usually in the form of self-completion questionnaires:

(1) The Eysenck Personality Inventory ("EPI", Eysenck and Eysenck 1964) is well known.

(2) The Severity of Alcohol Dependence Questionnaire (SADQ) (Stockwell et al. 1979) is a well-known measure of alcohol dependence. In this particular instance the subject was asked to recall the most severe period of drinking that he had ever experienced and to answer the SADQ as for that time. Thus, we have the worst ever dependence for the subject.

(3) The Purpose in Life inventory (PIL) (Crumbaugh 1968) measures attitudes such as "I believe man is absolutely free to make all choices / completely bound by limitations of environment," and "In achieving life's goals I have made no progress whatever / progressed to complete fulfillment."

Two final scales, which are not particularly standard, are:

(4) The Troubles scale, which measures physically and socially troublesome consequences of drinking, is inherited from the intake stage of the study, where it was developed by Dr. J. Orford (Edwards et al. 1977). It covers basically the areas of physical withdrawal (e.g., body shakes, blackouts) and social difficulties such as debt and homelessness.

(5) The Attributions inventory is a 70-item questionnaire developed for this particular followup to elicit from the alcoholic what influences and impacts have had the most effect on his drinking problem, for better or for worse. This scale will not be examined in this presentation, but is the subject of another paper (Edwards et al., forthcoming).

At this point, it is worth noting that any sort of summary measures over a time period are likely to weaken the measured relationship between the phenomena concerned. Thus, a summary measure of depression and another of drinking will probably not correlate as highly as they would if we had observed the year-by-year variation in each, assuming that they do indeed relate on a parallel basis year by year. This attenuation phenomenon would be observed in the case of all except the most slowly varying measures.

AIMS OF THE ANALYSIS

This long-term study was designed basically as a descriptive study and, although there were a few key issues around which it was organized, there are few specific hypotheses. The analysis should aim at presenting the wealth of information in a parsimonious manner. The original intent of the study, the comparison of a treatment with an advice group, is not a factor in the present analysis. The difference between these two groups in followups conducted after 1 and 2 years were minimal and now, 8 years further on there is little possibility that the groups differ in any significant respect. Rather than making simple comparisons of pre- and post-treatment states, looking for the often puny effects of treatment, the aim is instead to chart the larger, natural effects of 10 years of life. The current analysis, therefore, treats the data as though they were a simple 10-year follow-up of a single cohort of alcoholics.

Although referred to as a cohort, it is important to remember that these men were taken into the study simply by virtue of being consecutive attendees at the Maudsley clinic. Viewed as a long-term followup, therefore, what we have is a 10-year slice taken out of each of their lives in a random fashion. Furthermore, we must dispense with any idea of a "final outcome point" for the study since, in any important sense of the word, "outcome" was well under way when the individual entered the study. It is the whole 10-year slice that we wish to describe.

Ten years out of an individual's life provide a vast amount of detail, reflecting a complex interplay of forces. The first object, therefore, of our analysis of these data is to marshal the information from a particular viewpoint or around a specific framework so as to provide some order to the description. Even the crude information presented in the life chart showing the group's drinking history provides a challenge to the researcher in terms of its simple description. A cursory glance through that information shows that although there are some cases (4%) who were abstinent throughout the followup period and some (20%)

who remained in troubled drinking, over half the individuals displayed a patchwork of drinking and abstinence in which no clear organizing principle is easily discerned.

Part of the initial formulation of this study was the recognition of the obvious fact that this sort of information cannot be contained in simply the coded variables listed above. It is with this point in mind that we intend to analyse the recorded accounts of our study members given at interview.

CHOICE OF ANALYSIS

Our overall aim, then, is to provide a framework upon which we may hang our descriptions, particularly the descriptions of the drinking histories, partly with a view to the future analysis of the free response material in the tape-recordings.

One approach we could have adopted, but did not, would have been to embrace some particular theory of development or career and to see how far our information allowed us to fit the individuals to this model. As an alternative, we have tried to use the summary scores and scales to generate by means of multivariate analysis some organising principle from the data themselves.

The most immediately appealing and the simplest way of doing this is to sort the individuals in the study into groups or clusters with similar characteristics. These characteristics would be those represented by the summary scores and scales, which cover both the full followup period and also give further information on the current 1-year period. In looking for these clusters, we are not so much seeking to form some typology of alcoholism, but rather to separate out distinct life courses and pathways through these 10 years.

Such an approach uses no theoretical input, except implicitly in the selecting and partitioning of the information to be used in the analysis. An alternative method, which imposes a rather more abstract dimensional structure upon the data, is principal component analysis. This method of characterising the changes during the followup period is the subject of a further paper (Taylor et al., forthcoming), but it is the cluster analysis which is now to be described. Some comparisons with the principal components analysis will be drawn later.

Cluster analysis is a notoriously unstable procedure, but there are techniques for improving its performance. These include using stabilising "secondary" transformations, selecting representative variables, and replicating analyses by alternative cluster methods. All of these techniques have been employed in this particular analysis.

DETAILS OF THE CLUSTER ANALYSIS

In order to maximize the chance of finding a clustering of the individuals, an initial selection of key variables was made to construct a grouping. In this way, "noise" or irrelevant differences between people on such a large number of variables would be kept low. The choice was made from a priori considerations of the eight most likely variables to show some clustering effect and of further variables added to this set if they seemed to strengthen the separation between groups in any way. Variables were deleted from the set if they failed to separate the groups.

The method used was an average linkage hierarchical analysis (Lance and Williams 1966), made on the Euclidean distances between individuals after a secondary transformation (Sibson 1972). A second analysis of the data was carried out by Ward's method of clustering (Ward 1963) to check for sensitivity to the particular analysis. The two methods agreed very closely in distinguishing five groups of individuals, although in one analysis the two closest groups probably would not have been deemed two clearly separate clusters. This point is taken up briefly below.

IDENTIFYING THE SEPARATE GROUPS

The following hierarchical diagram (figure 1) shows the cluster structuring. Beginning at the top of the tree, a very small group of six individuals form the most clearly distinct grouping. This and the next most prominent group are both comprised of individuals with high dependence levels--one fares very badly and the other somewhat better. The remaining three groups are less clearly defined and form a spectrum running from those faring very badly to those generally doing very well. It is these last three groupings on the right-hand side of the diagram that were shown as the least separate groups in the clustering. It will be seen that the analysis suggests that these three might be fruitfully regarded as a single continuum, which has been arbitrarily divided at numerically convenient points.

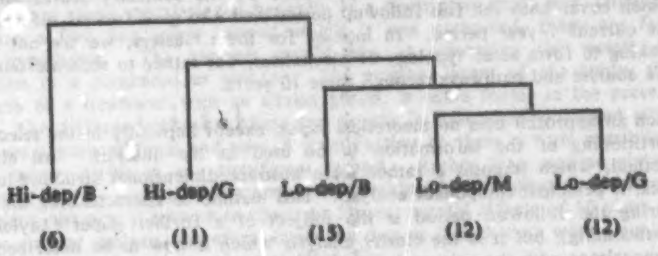

FIGURE 1

Cluster Structure of the Multivariate Data
(as described in the text)

We can look at these five groupings in detail by looking at their profiles across all the data that we have for the men. The following table 3 shows this information and gives the mean score for each of the groups on the variables used in the cluster analysis.

First, before looking at the drinking behaviour of the groups, it shows the SADQ scale means, to justify our calling the first two groups "high dependence"--bearing this labeling in mind will help make the table a little clearer. Note that the cutoff point on the SADQ suggested by Stockwell et al. (op. cit.) for labeling "severe" as opposed to "moderate" dependence was a score of 30. In figure 1 and table 3 the terms "Lo" versus "Hi" are intended only as a labeling and might more properly be termed low-to-moderate versus severe. The first two groups' means are too close for us to be able to claim that one is any higher than the other, but they both appear greater than the other three groups' means. Within these right-hand three groups, there is a gradient from moderately high to low dependence. (It is not possible to test differences between these groups for statistical significance, since they result from a cluster analysis of these data and are not predetermined groupings.)

TABLE 3

Cluster Profiles on the Multivariate Data Set

	Hi/B	Hi/G	Lo/B	Lo/M	Lo/G
SADQ	45	50	33	32	15
Alcohol 10yr	64	30	95	56	42
Alcohol 12m	75	7	133	53	48
Troubles 10yr	7.2	1.0	5.0	1.3	0.4
Social Adj. 12m	1.2	2.6	2.1	2.9	3.3
M.Health Adj. 12m	2.3	4.0	3.2	3.9	5.0
Purpose-in-Life	56	111	68	92	116
EPI - N	17	14	16	10	6
Arrests 10yr	.83	.33	.45	.27	.08
Treatment 10yr	1.8	1.5	0.8	0.6	0.3
Treatment 12m	.50	.08	.00	.00	.00
AA 12m	1.3	3.1	0.1	.00	0.0
AA 10yr	1.5	1.9	1.5	1.3	1.2
M.Health 10yr	1.7	1.7	1.8	2.0	2.5
Ph.Health 10yr	2.4	2.5	2.5	2.3	2.8
Prison 12m	.33	.00	.00	.07	.00
Marriage Brk. 10yr	.50	.42	.45	.47	.33
EPI - E	12	13	11	11	12

The second section of table 3 shows the amount of drinking over the whole followup period and over the current year in particular. The gradient across the low dependence groups is clearly visible in both periods. Note that for the two high dependence groups the levels of drinking are contained within this range, except that the "Good" high dependence group has been almost abstinent over the current year, though not in the past. Note too that the labels "Good" and "Bad" are used in a relative sense only within each half of the table, in that the "Bad" high dependence group has mean levels of drinking which are roughly the same as the "Moderate" low dependence group.

The third section of the table lists some of the other 1-year information. The Troubles scale, which covers predominantly physical withdrawal symptoms in the current year, as might be expected follows the same pattern as current drinking. Note though that the means are much higher in the high dependence groups than in the low dependence groups with the same level of drinking. In fact, the small group of dependent people who have continued drinking show the most extreme scores of all the groups. The remaining figures follow this same pattern, showing that in current social adjustment and mental health these groupings are consistent. The levels displayed in all these measures by even the better high dependence group--that is, those who are currently nearly abstinent--do not achieve the levels of the good low dependence individuals.

The fourth section of table 3 shows the continuation of the group profiles. The first item in the top section shows that the general level of confrontation with the law throughout the followup period has followed a pattern similar to the social adjustment score. We can see that treatment experience has been more intense in the high dependence groups, following the pattern of troubles and drinking. Treatment in a shorter period of time--the last 12 months--however, does not relate within the low dependence groups to this pattern; indeed it has been generally nonexistent for the individuals in these three groups.

Involvement with Alcoholics Anonymous (AA) is interesting, in that we can see it is predominantly confined to the two high dependence groups and it shows that the current abstainers are currently heavily involved. In the past, all groups have been involved with AA to some extent, again rather more amongst the highly dependent people. General levels of mental health throughout the followup show the same tendencies as the majority of other measures, but less strongly.

The final section of the table lists the remaining variables, which did not appear to relate to the clustering. It is worth recording that followup physical health in general--as we have measured it--does not correlate at all with the other variables. Our measure was limited to chronic or life-threatening disorders, which were in fact rather rare.

The overall patterns here suggest a division between high and low dependence individuals. The highly dependent people themselves are clearly divided into those who are now more or less abstinent, and a handful who have continued drinking. Within the low dependence groupings there is a gradient from bad to good in almost all the measures we have used.

Whether these groups form distinctly separate processes through the 10 years of observation or whether they merely divide a continuum of experience is not central to our analysis here. These divisions, even if they only segregate one extreme from another, serve to show the relationships between the variables; and it is these relationships that form the multidimensional structure of the overall phenomenon. A principal components analysis of these same data yields broadly similar concepts: that is, the centrality of dependence, drinking, and treatment in differentiating the overall patterns in the general indicators of well-being. It would require a larger study to determine which of these two descriptive methods is the more useful or the more accurate.

THE LIFE CHART DRINKING STATUS DATA

The drinking status data of the original "life chart" for the whole group (in table 2) can now be divided into five separate charts, one for each of these subgroups. Table 4 shows the amount of time spent, year by year, in troubled drinking. The extent of light, social drinking is not shown--since so little took place, it has been included for the present with the time spent in abstinence.

TABLE 4

Life Chart Drinking Status Data for Each Cluster

	'72	'73	'74	'75	'76	'77	'78	'79	'80	'81
Hi/B	8.3	9.3	9.3	8.5	9.0	8.5	6.5	6.8	5.5	7.0
Hi/G	7.1	5.0	3.8	3.1	5.0	3.9	4.3	1.9	1.9	0.1
Lo/B	10.4	9.8	11.3	11.9	10.8	11.6	11.5	11.7	11.9	10.1
Lo/M	6.7	7.5	6.6	7.1	6.6	6.2	5.7	5.9	5.9	6.1
Lo/G	5.8	6.3	6.8	5.3	5.0	4.5	4.3	4.1	4.0	4.4

Looking first at the three lower dependence groups, we can see that the general levels of drinking not only differ between them, but that these different levels have been maintained throughout the followup period, at least for the two worst groups. The third group, the one that fared best overall, is possibly an exception showing a very slight drift out of drinking. The worst group of the three has consistently drunk for almost all of the 12 months in every year.

In the two high dependence groupings, we see a stronger differential. The better of the two groups shows a marked drift out of drinking. The very small group of currently drinking, highly dependent people has maintained a steady level of drinking throughout the followup, and at a level approximately the same as the middle group of lower dependence drinkers. This last point may seem to reflect the earlier finding that, for the same amount of drinking, highly dependent individuals show more serious troubles. Here, however, it should be remembered that it is the percentage of time spent drinking that is being discussed.

What of the pattern of relapse and recovery within these groups? By examining separately each individual history it becomes apparent that the improvements in the high dependence group are made by individuals moving one by one into abstinence and remaining there, except for one or two scattered slips. The small group of currently drinking highly dependent men, by contrast, displays the most variable patterns in and out of drinking, whereas there is only one such individual amongst the better of the two (high dependence) groups.

Among the groups at the lower end of the dependence spectrum, the worst is comprised of men who have consistently drunk throughout the period. A few such individuals find their way into both of the better groups, presumably because these few do not score so badly on dependence or on the other measures of health. Why this is so, and whether they will in time move into worse conditions, are open questions. The best group commonly shows a pattern of complete abstinence soon after the beginning of the study. The middle grouping displays a range which includes some highly variable drinking patterns, but also a few individuals from each extreme of the drinking spectrum. This is in keeping with its being the midrange of a continuum of behaviours.

It is difficult to quantify this information, but a crude index of year-by-year consistency of behaviour--the average difference between percent of time spent in one category and percent of time spent in the other--supports these statements (55%, 88%, and 91%, 77%, 87%, respectively, for the five clusters).

PREDICTIVE FACTORS

The clusters obtained from these followup data can be related to information from the intake data, in particular to measures of the severity of the drinking problem as it then was. It must be remembered that these "life-charts" are all comprised of people who, from the first year onwards, vary greatly in the extent to which their alcoholism has developed. If there is any consistent relationship between stages of development and subsequent behaviour, then we would hope to find a measurable relationship between the measures of severity of problem at intake and the summary scores by which we have characterised the 10 succeeding years.

The final table (5) shows how these groups appeared at intake into the study. This information has not been used in any way in the analysis so far, but we can see that there is a tendency for the same pattern that existed throughout followup to have been present at intake. Only the first two items in this table--the daily alcohol intake (in millilitres) and the Troubles scale (0 to 10)--achieve statistical significance ($p < .05$), but with such small numbers of people this is scarcely surprising. Nonetheless, these two items suggest that both the groups subsequently classified as high dependence groups had a worse problem to begin with. This is supported by a crude intake dependence measure--a rating of "severe" as opposed to "moderate," made from case notes by an independent clinician involved in developing the SADQ--being greatest for these two groups. Similarly, some gradient was already present across the three low dependence groups. In fact, the Troubles score at intake correlates .44 ($p < .01$) with the subsequent SADQ score, the highest correlation that was found between intake and followup measures.

TABLE 5

Cluster Profiles on Selected Variables
Measured at Intake into the Study

	Hi/B	Hi/G	Lo/B	Lo/M	Lo/G
Daily Alc.	556	388	413	311	271
Troubles	6.8	6.1	5.5	4.1	3.1
Dependence	.67	.67	.64	.36	.42
Previous Trtmt.	.33	.50	.64	.40	.17
Yrs of Problem	5.8	4.9	6.1	3.9	2.2
Age at Intake	34	39	40	39	40

In the lower half of the table, the variables relating to the history of the alcoholism problem prior to intake are shown. These show rather weak patterning, but do suggest that the worst lower dependence group (Lo/B) might have had a long-standing problem. It is interesting to note that this group, who drank for almost 12 months in every year of the followup, were even previously a long-standing problem group. As to how they have maintained this status and an average SADQ score of 33, suggesting some of them would rate only moderately dependent, we can only speculate. There is, of course, no reason why everyone who drinks heavily should move from moderate into very severe dependence in terms of the syndrome measured by the SADQ (see, for example, Edwards et al. 1986). These individuals, who in general fare badly, are possibly distinguished by not experiencing the high dependence levels of the Hi/B group nor their resulting treatment and intermittent abstinence.

CONCLUSIONS

The patterns of drinking and abstinence which have been recorded vary enormously. There is a set of "hardline" drinkers, who have drunk in a heavy or troubled fashion more or less continuously throughout the 10 years. There are some who have moved into abstinence at various points over the years, and who are still abstinent; and there are others whose pattern has been to move to and from abstinence in irregular fashion. These two latter patterns, in particular, are more prominent in the groups showing higher levels of dependence.

Little relative change seems to have occurred amongst the majority of people in the study, in the sense that at intake the group profiles on drinking and associated troubles were similar to those at followup. It is not possible to say whether they have generally improved or worsened in an absolute sense, because of the different measuring procedures used at intake and follow-up. However, one scale which is consistent is the "Troubles" scale, and the mean ratings are much the same now as they were then.

The overriding and most important impression from these figures is that behaviour throughout the followup period is at least a two-dimensional phenomenon. Clearly, dependence is a powerful concept in separating out these individual life courses in respect to their abstinence, drinking relapses, and treatment, as well as their other indicator scores. Where there has been a shift into abstinence, it has been the highly dependent people who have disproportionately experienced it. Even so, for these abstaining, highly dependent people, their general well-being in other areas of their life does not match that of the best lower dependence group. It is clear that the categories developed by the cluster analysis are not just characterised by drinking behaviour, but also by the other measures used. Whether this categorisation will be useful or not is a question that awaits an answer, and which we will attempt to assess when we analyse the detailed tape recordings.

The group with the worst drinking record has not experienced (nor yet acquired) the worst levels of dependence, even though they tended to have at intake a long-standing problem. Rather, the worst dependence levels are associated with some of the lowest levels of well-being as measured by our indicator scores, possibly in conjunction with a pattern of treatment and relapse. The suggestion in these figures that this group at intake was the youngest on average and had the highest daily alcohol consumption comes from too small a sample to be substantiated. It should be recalled, too, that individuals in this group appear more erratic in their drinking record; and that both the highest dependence groups have undertaken treatment more than any of the others. On a speculative basis, therefore, it might be argued that the processes underlying relapse and recovery might profitably be regarded differently amongst the highly dependent groups than amongst moderate dependence drinking groups.

Part of the aim of this analysis, as previously stated, is to provide a framework for our subsequent analyses of the tape-recorded material. We hope in those analyses to be able to relate the present distinctions to the larger, unanswered questions given at the outset. Have the right dimensions been used by which to measure career, and has the measurement methodology been adequate? Will this discrete, grouped structure prove more or less valuable than a continuous approach; and what, if anything, will characterise the development processes within these groups?

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ACKNOWLEDGMENTS

David Brown's contribution to this work was supported by the Health Promotion Research Trust, while other staff were funded by the Addiction Research Unit's Medical Research Council Programme Grant.

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Relapse and Recovery Among Opioid Addicts 12 Years After Treatment

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Conceptual formulations involving drug abuse and the addiction process include a variety of physiological, psychological, social, and environmental factors. Many of the drug abuse "theories" presented by Lettieri et al. (1980) focus attention on separate and sometimes unique etiological factors, but more conceptual integration is necessary to deal with the complex stages of addiction careers--including initiation, maintenance, relapses, and termination. Longitudinal studies of addiction designed to address these conceptual domains are an important part of this theoretical development and refinement process.

Empirical evidence of relapse and recovery among opioid addicts over a period of approximately 12 years after admission to community-based treatment programs is presented in this chapter. The data include multiple episodes of daily opioid use and abstinence over time. Several analytic strategies have been used to explore the complex relationships involved in "relapse" and "recovery," terms which generally carry a medical connotation of "sick" or "well." A broader interpretation of these terms, however, is necessary when addiction outcomes are studied. That is, instead of focusing only on whether or not there was a return to drug use during a followup period, it may be more informative to examine fluctuations in drug use over time as well as other related outcomes, such as criminal involvement and employment. Operationally, the term relapse in the analyses of opioid addicts presented here refers to the reoccurrence of daily opioid use after a temporary period of abstinence from daily use. Reduction of drug use, criminal involvement, and unemployment are considered to be general indicators of recovery. These measures are also examined in relation to several domains of theoretical influence as discussed in previous chapters.

The data used in this chapter--the Drug Abuse Reporting Program (DARP)--were initiated in 1969 for the purpose of describing and assessing clients and services in community-based drug abuse treatment programs. During 1969 to 1973, intake records were obtained on almost 44,000 admissions to 52 federally funded agencies from across the United States. Since that time, data collection and research have been conducted to evaluate during-treatment performance (Sells 1974; Sells and Simpson 1976), posttreatment outcomes in the first few years following DARP treatments (Sells and Simpson 1980; Simpson and Sells 1982), and long-term outcomes based on 12-year followup studies of opioid addicts (Simpson et al. 1986a, 1986b). This study focuses on relapse and recovery of addicts over time. After describing the sample, the first section summarizes outcomes at different points in time from the DARP preadmission baseline period to the 12-year followup interview. Since many addicts experienced repeated cycles of abstinence and addiction over time, the second and third sections describe relapse and recovery episodes during Years 1-6 and during Years 7-12, respectively. Finally, the fourth section examines social adjustment indicators associated with relapse.

DESCRIPTION OF THE SAMPLE

6-Year Followup. The first two cohorts of admissions to drug abuse treatment programs in the DARP (June 1969 through May 1972) totaled 27,214. Using this population, the initial wave of the 6-year DARP followup studies (Simpson and Joe 1977) included a stratified random sample of 4,107 opioid and nonopioid drug users from 25 different treatment agencies in the United States. Of this sample, 87% of the cases were located, and successful interviews were completed with 3,131 respondents (i.e., 76%). The stratification factors for the sampling procedure included DARP treatment classification, time in treatment, race-ethnic group, sex, age, and treatment agency. Treatments included methadone maintenance (MM) programs, therapeutic communities (TC), outpatient drug-free treatments (DF), and outpatient detoxification (DT); an intake only (IO) group was also selected, comprised of persons who completed intake and admission procedures but who did not return for treatment in DARP. (The IO group in this study was viewed as an important comparison group but not as a control group since the DARP treatment groups were not formed through random assignment.)

12-Year Followup. From the completed 6-year followup interviews described above, a sample of 697 cases was subsequently selected for the 12-year followup study. All were daily opioid users at the time of admission, and the sample included black and white males from all five treatment groups, as well as black and white females from methadone maintenance treatment programs. The sample was drawn from 18 different DARP treatment agencies, as explained by Simpson (1984a). The fieldwork, including locating and interviewing the sample, was carried out under contract during 1982 and 1983 by the National Opinion Research Center (NORC). Altogether, 80% of the cases were located: 490 (70%) were interviewed after granting informed consent, 52 (8%) were deceased, and 13 (2%) refused to be interviewed. The remaining 142 (20%) were not located before time and resources for the fieldwork ran out. Analysis of treatment admission and 6-year followup data revealed no evidence of sampling bias associated with the nonlocated cases in the 12-year followup study (Simpson 1984a).

The followup interviews were conducted face-to-face by trained interviewers using strict procedures to protect the confidentiality of information. Average duration of the interviews was approximately 2 hours, for which the respondent was paid $15. The interview assessed behavioral changes and outcomes over time, as well as psychological and social factors involved throughout the addiction career. Major criterion behaviors included illicit drug use, drug abuse treatment, alcohol use, employment, and criminality. Checks for internal consistency and comparisons of self-reported information with results of urinalyses and with criminal justice records of post-DARP incarcerations indicated a high level of reliability and validity of the data (Simpson 1984b).

The sample of 490 former opioid addicts was comprised of 18% females and 82% males (a difference due to sampling constraints in the treatment population),

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included 51% blacks and 49% whites, and had a median age of 34 at the time of the 12-year followup interview (with 19% over 40 years of age). However, the findings presented in this chapter are based only on males (N = 405) since the female sample was relatively small and several outcome measures presented below are differentially associated with gender. For instance, a study by Marsh and Simpson (1985) which focused on the female sample found that sex-related differences exist on several behavioral measures (such as employment and criminality) as well as psychological factors (such as motivations for treatment). Sociodemographic and DARP treatment characteristics of the male sample are described in table 1.

OUTCOMES OVER TIME

Behavioral outcomes over time, from the pre-DARP baseline throughout the 12-year followup period, are summarized in table 2. The 6-year followup study obtained information on a retrospective month-by-month basis for Years 1-6--from termination of DARP treatment until the Year 6 followup interview. Thus, it served as the basis for outcome tabulations in Years 1 to 3 immediately after termination of DARP treatment and Year 6 subsequent to admission. The 12-year followup study served as the basis for outcome tabulations in Year 12 after admission. Tabulations for drug use and employment measures in each time period were based only on "time at risk" (i.e., while persons were not confined in jail or residential treatment facilities).

Individual measures of drug use are grouped into three different categories in table 2, which include opioids (heroin, illegal methadone, and other opiates), marijuana, and other nonopioids (cocaine, amphetamines/stimulants, barbiturates/sedatives, and hallucinogens). Other individual measures include time spent in jail or prison and 6 months or more each year of employment (i.e., at least 50% of the months at risk each year). Simpson et al. (1986a) examined these data in detail and noted that the 12% increase in nonopioid use from Year 6 to Year 12 primarily represented cocaine use.

In order to examine different outcome measures simultaneously, the sample was classified into six mutually exclusive categories, which are shown in table 2 and illustrated in figure 1. These categories emphasize drug use and incarcerations during each year. The first category includes persons who were institutionalized for the entire year (usually in jail or prison, except for residential treatment in a few cases). The second and third categories include daily opioid users (in 1 or more months) in combination with and without jail. The fourth category represents those who were in jail or prison (for 1 or more months) but who were not daily opioid users. (This category was divided almost equally between persons with no drug use and those who continued to use opioids less than daily or who used other nonopioid drugs.) Finally, the last two categories had no jail and low drug involvement; category five included less-than-daily opioid users (defined as the use of opioid and/or nonopioid drugs in 1 or more months, but no daily opioid use), and category six included those with no drug use (defined as no use of any drugs during the year, with the exception of less-than-weekly marijuana use).

These data indicate that, following substantial declines in daily opioid use and incarcerations in the early years of the followup period, category size tended to stabilize over time. It should be noted, however, that the pre-DARP measure for jail and prison represented a lifetime rate since 1-year preadmission baseline data were not available. During Year 6 and Year 12, about one-fourth of the sample

TABLE 1

Description of the Sample at Admission to DARP Treatment (N = 405)

Male	100%
Black	53%
White	47%
Under 21 years old	25%
21-25 years old	39%
26-30 years old	20%
Over 30 years old	16%
Ever arrested	87%
Ever jailed	71%
Employed any time last year	67%
DARP Treatment Assignment:	
Methadone maintenance	22%
Therapeutic community	24%
Outpatient drug-free	18%
Outpatient detoxification	21%
Intake only	15%

TABLE 2

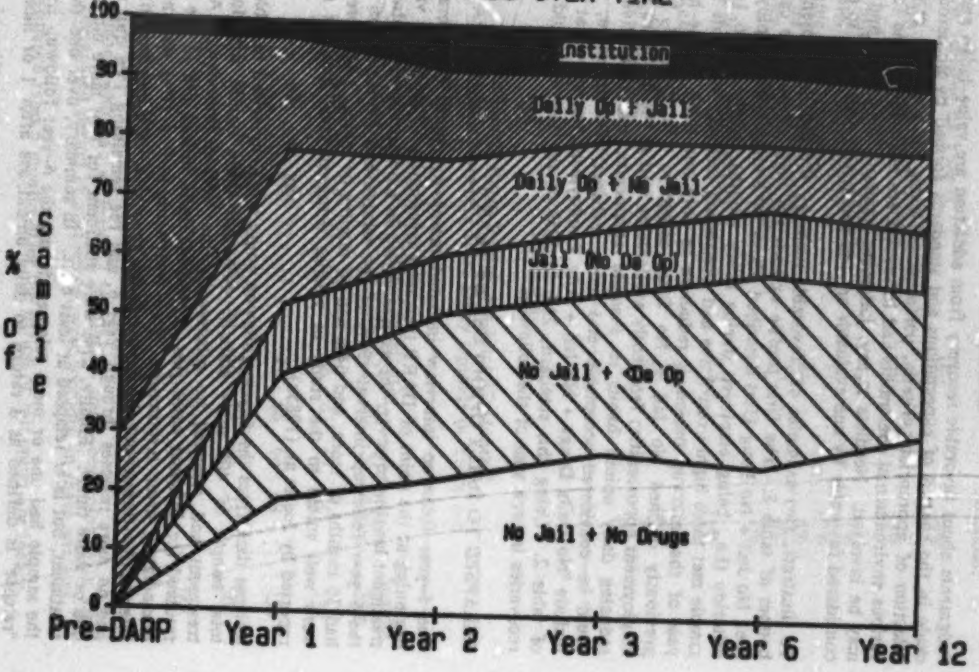
Outcomes Over Time for Male Addicts (N = 405)

	Pre-DARP	Years During Followup				
		1	2	3	6	12
INDIVIDUAL MEASURES						
% Daily Opioid Use	100	47	34	28	25	24
% Any Opioid Use	100	63	51	45	42	39
% Marijuana Use	51	55	56	51	57	61
% Any Nonopioid Use	55	39	35	34	35	47
% Any Jail/Prison	71	33	33	30	30	29
% Employed 6 Mos. or More	36	49	57	61	64	54
OUTCOME CATEGORIES (Mutually Exclusive)						
% Institutionalized	3	3	8	8	7	9
% Daily Op + Jail	68	19	15	11	12	11
% Daily Op + No Jail	29	26	16	15	11	13
% Jail (No Daily Op)	0	12	10	11	11	10
% No Jail + <Daily Op	0	21	28	27	33	25
% No Jail + No Drug Use	0	19	23	28	26	32
FAVORABLE RECOVERY PROFILES						
% No Drugs + No Jail + 100% Employment	0	8	12	14	12	11
% No Daily Drugs + No Jail + Any Employment	0	25	32	37	39	30

Note. For pre-DARP measures, drug use was based on the last 2 months before admission to DARP, employment was based on the last 12 months, and incarceration in jail or prison was a lifetime measure. Sample sizes were adjusted in each time period so that tabulations were based only on persons who were "at risk" (e.g., persons in jail during an entire year were omitted from drug use and employment tabulations for that period).

FIGURE 1

OUTCOMES OVER TIME



continued daily opioid use, and almost half of these daily users also spent time in jail. About one-fifth of the sample continued to be incarcerated for all or part of each year in the followup period, even though they were not using opioids daily. Thus, 57% of the sample appeared to be making reasonable adjustments by Year 12 since they were not jailed and did not use opioid drugs daily. Indeed, over half of the former addicts in these two categories in Year 12 reported no drug use at all (except less-than-weekly marijuana in some cases).

Judgments about favorable recovery from addiction are value-laden and must be made in the context of expectations and standards formed by numerous factors. Selection of appropriate criteria, performance levels for specified criteria, and various environmental constraints and influences are but a few of the factors that may be involved. Needless to say, judgment standards may vary, and outcomes considered favorable by one evaluator are not necessarily acceptable to another.

To illustrate, two examples of "favorable recovery profiles" are presented at the bottom of table 2. The first profile extends the logic of outcome category six (i.e., No Jail + No Drug Use) described above by adding 100% employment as a criterion (i.e., being employed during every month). Only 8% to 14% of the sample met these highly restrictive and demanding recovery standards in any one year of the followup period, a reduction to only one-third to one-half of the previously defined No Jail + No Drug category. In view of the limited employment opportunities frequently available as well as the problems inherent in reducing daily opioid habits to absolute abstinence, less restrictive standards could be considered acceptable and more realistic. For example, this might include "No Daily Drugs + No Jail + Any Employment," as shown at the bottom of table 2. Using this standard, 25% to 39% of the sample would qualify as recoveries in each year of the followup.

RELAPSES TO DAILY OPIOID USE BY YEAR 6

The 6-year followup interview included month-by-month behavioral outcomes beginning at the point of DARP treatment termination. Due to the variability in treatment length, however, the sample varied in the number of months of data in the 6-year followup interval: 97% of the sample had 24 months or more, 84% had 36 months or more, and 64% had 48 months or more. Therefore, these data were well suited to the study of relapse using survival analysis methods, as reported by Joe et al. (1985a).

Relapse data from the 6-year followup study are summarized in table 3. Of the total sample of 405 male addicts, 44% quit daily opioid use during DARP treatment and reported no relapses by the Year-6 interview. Another 35% resumed (or in some cases just continued) daily opioid use in the first month immediately after termination from treatment; a few (1%) continued without interruption throughout the 6-year followup period, 19% quit sometime later and had no more relapses through Year 6, and the remaining 15% quit and relapsed one or more times. Finally, 21% were abstinent for 1 or more months following treatment, but later relapsed at least once. In summary, over one-third (36%) of the sample had one or more relapses during the 6-year followup interval, when "relapse" is defined as a return to daily opioid use after 1 or more months of abstinence.

How is length of abstinence from daily opioid use related to subsequent relapse? In order to examine abstinence rates over time, the first period of abstinence from daily opioid use for 1 month or longer was selected for each person. The

TABLE 3

Summary of Data for Relapse to Daily Opioid Use by Year 6 Followup (N = 405)

	Number of Persons	Percentage of Total
I. Quit & No Relapse by Year 6	180	44%
II. Immediate Daily Use After DARP	140	35%
a. Continuous Use Thru Year 6	5	1%
b. Later Quit--No Relapse	77	19%
c. Later Quit--1 Relapse	31	8%
d. Later Quit--2-3 Relapses	23	6%
e. Later Quit--Over 3 Relapses	4	1%
III. Delayed Relapse After DARP	85	21%
a. 1 Relapse	53	13%
b. 2-3 Relapses	27	7%
c. Over 3 Relapses	5	1%

TABLE 4

Abstinence Rates During the First 42 Months[1] After Initial Abstinence from Daily Opioids in Years 1-6

Minimum Period of Abstinence	% Still Abstinent in Month											Sample Size
	6	9	12	15	18	21	24	27	30	36	42	
3 Months	92	86*	80	74	71	68	67	66	63	61	59	252
6 Months	--	93	87*	80	77	74	72	71	68	66	63	233
12 Months	--	--	--	92	89*	85	83	82	79	76	73	202
24 Months	--	--	--	--	--	--	--	99	95*	91	88	168

[1] Only those persons who had at least 42 months of data, beginning with first month of the designated period of abstinence, were included in these analyses.

*Identifies abstinence rates 6 months after the period of minimum abstinence.

_(Underline) Identifies abstinence rates 12 months after the period of minimum abstinence.

total length of this first abstinence period for each person was determined, and abstinence rates over the following 42 months were calculated as shown in table 4. These data can be used to estimate the probability of maintaining abstinence over time, given the initial duration of abstinence. For instance, table 4 shows that 86% of those with a minimum abstinence period of 3 months were still abstinent in Month 9 (i.e., 6 months later), while 95% of those with at least 24 months of abstinence were still abstinent 6 months later (in Month 30). For abstinence at 12 months later, the rates for these two groups were 74% and 91%, respectively. In other words, 74% of the former addicts able to maintain abstinence from daily opioid use for at least 3 months were still abstinent a year later, compared to 91% of those able to maintain abstinence for at least 24 months.

Although the DARP database is not comprehensive with regard to various month-by-month events which immediately preceded and possibly influenced relapse to daily use by Year 6, records were available on other drug use. These data showed that about one-third (i.e., 31%) of the 143 persons in the sample who relapsed by Year 6 used opioids less-than-daily within the last 3 months immediately before relapse (and 27% used within the last month). The other two-thirds therefore relapsed to daily use more abruptly and without extended transitional use in the preceding months.

RELAPSES TO DAILY OPIOID USE BY YEAR 12

At the time of the 12-year followup, addiction careers in this sample ranged from 1 to 35 years, with a median length of 9.5 years. Almost one-fourth of the sample reported 1 or more months of daily opioid use in Year 12, down from 47% in the first year after DARP treatment.

Table 5 indicates that individuals who used opioids daily were not always the same from one year to the next. Daily opioid use declined from 47% to 24% between Years 1 and 12 (as indicated in column I), but the cumulative tally in column II shows that 75% of the sample used opioid drugs daily sometime during this followup. Finally, column III reveals that 15% had at least one relapse after quitting during Year 1, increasing to 65% those who relapsed one or more times by Year 12. Thus, 35% of the sample never relapsed again after they eventually quit.

Aside from describing daily opioid use trends through Year 12, the tabulations in table 5 present several alternative drug use outcome measures using the same database. Percentages of daily users for successive time intervals--shown in column I--appear much more favorable than the cumulative tabulations in columns II and III, but all are technically appropriate methods for describing outcomes. Although not reported in table 5, another different and equally appropriate procedure for describing daily opioid use outcomes is the length of time since last addicted before the 12-year interview. For example, 76% of this sample had not used opioids daily in the last year before followup, 68% in the last 2 years, 63% in the last 3 years, 48% in the last 6 years, 35% in the last 8 years, and 29% in the last 10 years. Finally, 25% reported no daily opioid use at all following DARP treatment.

Because of methodological and conceptual differences in the data-collection procedures used for the 6-year and 12-year followup studies, the same relapse analyses could not be extended directly to the 12-year data. In particular, the 12-year study did not obtain records on month-by-month drug use and other

TABLE 5

Comparisons of Measures for Daily Opioid Use Over Time

	I Current % of Daily Users	II Cumulative % of Daily Users	III Cumulative % Who Quit and Relapsed
Year 1 Post-DARP	47	47	15
Year 2 Post-DARP	34	50	25
Year 3 Post-DARP	28	53	31
Year 6 Followup	25	56	35
Year 12 Followup	24	75	65

Note. Figures for Year 12 (representing the years between 6 and 12) were calculated from the 12-year followup interview using data-collection methods different from those in the 6-year followup interview, and this may have affected the comparative precision of the Year 6 and Year 12 cumulative data in columns II and III. Also, it is noted that Years 1, 2, and 3 Post-DARP refer to the time immediately following DARP treatment; the followup interviews were conducted an average of about 6 and 12 years, respectively, after DARP treatment began, and the data for Year 6 and Year 12 are based on the 12 months immediately before each interview.

behavioral outcomes; instead, the 12-year data focused more on interpretations and perceptions of respondents regarding their addiction histories, the events and reasons associated with various career phases, and their long-term outcomes on the behavioral criteria studied in earlier DARP research. It was possible, however, to link the 6-year and 12-year data in other ways to study relapse and recovery. Of special interest was the comparison of periods of abstinence from daily opioid use in Years 1-6 (recorded in the 6-year followup) with outcomes in Years 7-12 (obtained from the 12-year data). Based on the results presented above from the 6-year data, it was expected that longer abstinence during Years 1-6 would be associated with better outcomes in Years 7-12.

To examine these relationships, the sample was first classified according to the longest period of continuous abstinence from daily opioid use during the 6-year followup interval. Five abstinence groups were defined--including 0-12 months (11% of the sample), 13-24 months (18%), 25-36 months (23%), 37-48 months (28%), and over 48 months (20%)--and then used to examine outcomes in Years 7-12.

Table 6 presents results for daily opioid use in Years 7-12, Years 10-12, and Year 12; Year 12 data also includes Any Opioid Use, Any Jail or Arrests, and 50% Employed (i.e., employment during one-half or more of months at risk). Daily opioid use information was obtained in the 12-year interview by asking how long it had been since the respondent last used opioids daily, and this was the source of data for the Years 7-12 and Years 10-12 analyses. More thorough behavioral outcomes were obtained for the last year before interview, and these data served as the basis for the Year 12 analyses.

Consistent with earlier findings, table 6 indicates that length of abstinence in Years 1-6 was significantly related to outcomes in Years 7-12. That is, persons with longer abstinence had better long-range outcomes; 72% of the 0-12 month abstainers in Years 1-6 returned to daily opioid use during Years 7-12, compared to 33% of those who had over 48 months of abstinence. For the last 3 years of the followup period (Years 10-12), these rates were 61% and 25%, respectively; and for the last year (Year 12), they were 35% and 12%. These results for Year 12 also generalized to other behavioral measures, as observed at the bottom of table 6. In particular, longer periods of abstinence were associated with better outcomes on the criteria for Any Opioids, Any Jail or Arrests, and 50% Employment.

FACTORS ASSOCIATED WITH RELAPSE AND RECOVERY

Several "reasons" were found to be almost universally reported as causes for relapses--including the state of relaxation caused by opioids (91%), the rush (85%), the need to avoid or eliminate withdrawal symptoms and drug craving (81%), and the use of opioids to help forget troubles (80%). Similarly, the most common reasons for quitting daily opioid use, as reported by those who were abstinent a year or longer before the 12-year followup, included "being tired of the hustle" (83%) and "needing to change after hitting bottom" (82%). Because they were so common, these reasons are not very discriminating; in addition, they appear to represent more of a background or contextual setting than explicit causes which precipitate and sustain behavioral change.

Simpson et al. (1986a, 1986b) have described in detail the reasons given for addiction stages, and Joe et al. (1984) have examined relationships among the reasons associated with different stages. Using canonical correlation analysis,

TABLE 6

Outcomes in Years 7-12, by Longest Abstinence from Daily Opioids in Years 1-6

	% of Group Reporting				
Longest Abstinence in Years 1-6	Daily Opioids	Any Opioids	Any Jail or Arrests	50% Employed	Sample Sizes
	Years 7-12 (Last 6 Years)				
0-12 mos.	72	--	--	--	46
13-24 mos.	58	--	--	--	73
25-36 mos.	43	--	--	--	94
37-48 mos.	38	--	--	--	111
Over 48 mos.	33	--	--	--	81
X^2(df=4)	24.8***	--	--	--	
	Years 10-12 (Last 3 Years)				
0-12 mos.	61	--	--	--	46
13-24 mos.	42	--	--	--	73
25-36 mos.	38	--	--	--	94
37-48 mos.	32	--	--	--	111
Over 48 mos.	25	--	--	--	81
X^2(df=4)	18.9***	--	--	--	
	Years 12 (Last Year)				
0-12 mos.	35	55	57	37	46
13-24 mos.	30	43	58	41	73
25-36 mos.	27	44	40	51	94
37-48 mos.	21	30	41	63	111
Over 48 mos.	12	30	38	63	81
X^2(df=4)	11.6*	11.2*	10.27*	15.1**	

Note. Outcome data other than daily opioid use are not available for Years 7-12 and 10-12.

*p<.05
**p<.01
***p<.001

they found that reasons for changes across stages were related; for example, there was a tendency for interpersonal relations at different stages to be more consistently involved in influencing addiction processes for some individuals than others. Further analyses of these and related factors associated with length of addiction (Joe et al. 1985b) extended these results by finding evidence for complex and multiple paths of addiction. For instance, one "lifestyle" associated with length of time addicted was represented by a subgroup of employed addicts who supported themselves during longer-than-average addiction careers (possibly because they experienced fewer street risks than nonworking addicts). They also found that longer addictions were reported by persons with lower educational and socioeconomic background, higher social and criminal deviance throughout careers, higher susceptibility to environmental and drug availability factors, and higher responsiveness to family influences.

The most recent development in the study of these longitudinal predictors has been to focus on relapse using event history analysis for modeling survival curves (Joe et al. 1985a). The results have been consistent with other DARP research, as well as with earlier literature reviewed by Platt and Labate (1976), in showing that addicts with the lowest risk of relapse to daily opioid use typically included those who were married, older, better educated, better employed, less (criminally) deviant, and better adjusted psychologically than the others. In other words, social adjustment emerges as a major predictive construct involved in relapse and recovery. To explore this concept further, therefore, the sample was classified with regard to social adjustment indicators based on (1) pre-DARP admission data and (2) post-DARP followup data from Years 1-6. These groups were then used to compare relapse and related criteria from the 12-year followup.

First, the sample was classified using intake information collected at the time of DARP treatment admission; that is, the number of "positive" social adjustment characteristics (i.e., married, over 27, over 12 years of education, no previous incarcerations, and 6 months or more employment in the previous year) were counted for each person, and the sample was divided into "high" and "low" groups. Next, the sample was classified again (independently of the previous classification) using post-DARP information from Years 1, 2, 3, and 6 of the 6-year followup; for each separate year, the number of "positive" characteristics (i.e., no jail, 6 months or more employment, and no more than 1 residential move) were counted and then summed over the four 1-year periods. Based on these summed scores, the sample was divided into "high" and "low" groups. These pre-DARP and post-DARP classifications were then used to form four groups defined by social adjustment levels at DARP admission and during the 6-year followup. These groups were labeled High-High (n = 117), High-Low (n = 110), Low-High (n = 95), and Low-Low (n = 83).

Comparisons of 12-year outcomes for these four groups are summarized in table 7. In brief, the low-level social adjustment groups--especially those with low adjustment during the 6-year followup period--had the poorest outcomes. Over the entire period of Years 1-12, relapse to daily opioid use was reported by 51% to 81% of these groups, and it was highest for the two groups with low social adjustment during the 6-year followup (i.e., Hi-Lo and Lo-Lo). Daily opioid use during Years 7-12 was 41% for the Hi-Hi group, 38% for the Lo-Hi group, 48% for the Hi-Lo group, and 57% for the Lo-Lo group. Likewise, the same basic pattern was observed for Years 10-12 (the last 3 years before the interview), and they generalized to criminality and employment measures in Year 12. All were statistically significant except for daily opioid use in Year 12.

TABLE 7

12-Year Outcomes by Social Adjustment indicators Over Time

	Social Adjustment Levels, Classified at DARP Intake and for 6-Year Followup				X^2
Outcomes	Hi-Hi	Lo-Hi	Hi-Lo	Lo-Lo	(df=3)
	%	%	%	%	
Years 1-12:					
% Ever relapsed to daily opioids	58	51	75	81	24.7*
Years 7-12:					
% Used opioids daily	41	38	48	57	7.6*
Years 10-12:					
% Used opioids daily	35	27	39	48	8.6*
Year 12:					
% Used opioid daily	23	19	25	29	2.5
% With any jail	17	17	42	42	30.2**
% Employment 50% or more	62	64	41	44	15.4**

*p=.05
**p<.01

Inspection of these data indicates that outcomes for the two groups with high social adjustment levels during the 6-year followup (Hi-Hi and Lo-Hi) were comparable, and they were more favorable than those for the two groups with low levels of social adjustment in the 6-year followup (Lo-Lo and Hi-Lo). Thus, indicators of social adjustment at treatment admission were less important than those for the 6-year followup when predicting Years 7-12 outcomes. The previous findings by Joe et al. (1985a) showing that admission data served as significant predictors were based on survival curves, beginning immediately after treatment (i.e., Year 1). Changes occurred in social adjustment levels over time for some individuals, however, and the present data show that the most recent, or proximate, indicators of adjustment appear to be the most pertinent for predicting outcomes.

CONCLUSIONS

Compared to similar research based on smoking and alcohol, the study of users of opioid and other illicit drugs in our society is complicated by several barriers to observing and measuring these illegal behaviors. Changes over time in the legal status and the availability (as well as quality) of drugs represent highly complex influences on individual decisions about using drugs. That is, random fluctuations in the quality and availability of drug supplies have moderating effects on various social, psychological, and physiological factors involved in illicit drug use by individuals. Environmental constraints, such as confinements in jail or residential treatments, must also be recognized in identifying "time at risk" for analyzing and interpreting drug use outcomes at any given time, and especially before other factors are analyzed as influences in the relapse or recovery process.

The longitudinal research findings presented here are helpful in establishing "baseline" expectations for the long-term outcomes of opioid addicts. Among male addicts admitted to the DARP in 1969-73, 53% had no daily opioid use in the first year after treatment, and this rate increased to 66% in the second year and to 72% in the third year. During the sixth year after admission to treatment, 75% of the sample reported no daily opioid use. This percentage remained virtually unchanged 6 years later (at Year 12).

Significantly, 19% of the sample who used opioid drugs daily at some time during Years 7-12 after admission to treatment did not use them daily in the previous Years 1-6. This illustrates the long-term threat of relapse over time. One-fourth (25%) of the sample never used opioids daily during the 12-year followup period, but 65% quit for a month or longer and then relapsed to daily use one or more times. By the end of Year 12, however, 63% of the sample had not used opioid drugs daily for a period of at least 3 years.

These data show that relapse to daily opioid use is prevalent among addicts. However, relapse is neither a random nor a certain occurrence. Multiple episodes of the abstinence-relapse cycle occurred for many addicts, but resistance to relapse increased as the period of abstinence became longer, and these behavioral improvements also generalized to lower rates of arrests and incarcerations, as well as more employment. Unfortunately, there was no apparent threshold for length of abstinence which insured permanent recovery. Instead, there was a probabilistic decrease in the subsequent occurrence of relapse as abstinence became longer.

Indicators of social adjustment or adaptation during Years 1-6 (i.e., higher employment, less legal involvement, and fewer residential moves) likewise predicted abstinence from daily opioid use in Years 7-12. Although similar social adjustment criteria measured at treatment admission--including marital status, age, educational achievement, and employment history--predict relapse rates beginning in the first year following treatment (Joe et al. 1985a), these particular measures are generally unrelated to long-term outcomes recorded years later. As Lehman and Simpson (1984) and Lehman et al. (1985) have reported, the statistical significance of most predictor variables diminishes as outcome measures become more temporally distant.

The DARP followup studies give support to several major theoretical domains--sociological, psychological, physiological, and environmental--as being influential factors in the stages of opioid addiction, relapse, and recovery. For example, major reasons cited for starting opioid use include the psychological euphoria and sensation, easy availability, and social pressures. Psychological escapism and euphoria were major reasons for sustaining opioid use over time, while the relative significance of social influences during this stage diminished. "Drug craving" emerged later as a factor in the maintenance and relapse of drug use. Reasons for quitting addiction primarily involved personal psychological crises, along with family and social pressures, and such environmental factors as legal threats and drug availability (Joe et al. 1984). In addition, the role of drug abuse treatment over time was regarded by most addicts as significant in the process of recovery (Joe et al. 1982-83; Marsh et al. 1985; Simpson 1984c).

For treatment programs, these results emphasize the importance of aiming to change short-term behaviors and identifying appropriate support mechanisms and social networks to maintain improvements over time. Fortunately, from a therapeutic point of view, client characteristics and background at intake do not predetermine long-range outcomes. Criminal involvement and other indicators of social adjustment are predictive of short-term outcomes, but long-term therapeutic change is not limited by these or other factors studied in the DARP. However, some long-term addiction careers are related to stabilized lifestyle patterns involving family relations, criminality, or employment (Joe et al. 1985a) which appear to enable and help sustain addiction. On the other hand, virtually all recovering addicts in this sample reported experiencing a personal psychological crisis as part of the motivation and decision-making process to quit.

Successful intervention may therefore begin with a crisis which has significant personal implications for an addict, and the most appropriate role for treatment or other intervention agents is to understand and use the crisis to guide and affirm positive change. There also appears to be a tendency for one's motives in starting and stopping addiction to be similar over time. For instance, social pressures and friends are particularly influential for some addicts. This finding may have therapeutic utility in identifying the most effective approaches for intervention by determining motivational forces in starting and maintaining daily use. However, more work is needed which focuses on the systematic assessment of these motivational factors and the "readiness to change" by addicts.

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ACKNOWLEDGMENTS

This paper is part of a series of interrelated studies on addict careers and 12-year followup outcomes based on the Drug Abuse Reporting Program (DARP). It was supported by the National Institute on Drug Abuse grant R01 DA-03419 as part of a longitudinal drug abuse research project which began in 1968. The interpretations and conclusions, however, do not necessarily represent the position of NIDA or the Department of Health and Human Services.

The authors also acknowledge the contributions of many individuals over several years. Drs. S.B. Sells, George W. Joe, and Wayne E.K. Lehman serve as senior members of the research team, and the data collection for the followup interviews was conducted by the National Opinion Research Center.

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The Process of Smoking Relapse

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Smoking cessation treatments now regularly produce cigarette abstinence in 90 to 100 percent of clients (e.g., Erickson et al. 1983; Hall et al. 1984; Tiffany et al. 1985). Despite nearly universal cessation, the most successful smoking interventions tend to produce year-long abstinence in only about half of all treated subjects (Hall et al. 1984; Lando 1977; Tiffany 1985). Such statistics underscore the frequent urgings that smoking researchers shift their focus from cessation treatments to treatments aimed at extending, rather than producing, abstinence (e.g., Marlatt 1982). An initial step in the effort to extend abstinence (prevent relapse) is the analysis and characterization of relapse as a naturally occurring process. Such information could be beneficial to efforts to design effective abstinence extension treatments. For instance, information on common relapse situations might allow therapists to target their maintenance procedures at a circumscribed set of situations. In addition, subjects may spontaneously use strategies to deal with relapse and relapse crises (where the smoker is tempted to smoke but does not necessarily do so) that may suggest treatments of general benefit.

While relatively few studies have been conducted that are targeted at characterizing the smoking relapse process, the few studies extant yield general patterns of findings that are reassuringly consistent. Available data suggest that a great deal of variance in relapse incidence can be associated with a limited set of affective, behavioral, and contextual variables. For instance, smoking relapse and relapse crises tend to occur when individuals are: experiencing a negative affect such as anxiety, depression, anger (e.g., Cummings et al. 1980; Shiffman 1982) in the presence of other smokers smoking (Shiffman 1982); experiencing interpersonal stress (Marlatt and Gordon 1980; Shiffman 1982); or consuming food or beverage--especially alcohol (e.g., Shiffman 1982).

In addition to data on smoking relapse, there now exists a well-articulated theory of the relapse process (Marlatt and George 1984; Marlatt and Gordon 1984). Marlatt's theory constitutes an interesting and important departure from other approaches to the analysis of relapse. Instead of focusing on pre-existing personal characteristics that predict relapse (e.g., level of physical dependence, personality factors), Marlatt has focused on events surrounding initial uses of a drug during the postcessation period. According to Marlatt's theory, a person's cognitive/affective reaction to initial postcessation drug use is a potent determinant of subsequent drug use.

One possible response to postcessation drug use is what Marlatt has labeled the "abstinence violation effect" (AVE), a cognitive/affective reaction comprising two principal components: an attribution made with respect to the causes of drug use (the "lapse") and an affective reaction to the lapse. The attribution process is that the individual attributes the cause of the lapse to internal, stable and global self-features that are assumed, by the individual, to be uncontrollable, e.g., "lack of willpower," or addictive personality (Abramson et al. 1978; Weiner 1974). This attributional process elicits an affective reaction characterized by conflict and guilt. In theory, the stronger the AVE (the closer attributions are to the prototype and the greater the negative affective reaction), the more likely a "lapse" is to lead to relapse (regular drug use). The magnitude of the AVE is posited to be a positive function of: the individual's commitment to remaining abstinent, the amount of effort previously expended to remain abstinent, and the duration of the abstinence period.

Marlatt recognizes that relapse is affected by factors other than the AVE. For example, he states that coping response execution will reduce the risk of relapse (Shiffman 1982). In Marlatt's model, coping likelihood appears to be a function of both a subject's confidence in his ability to cope with the relapse crisis (Shiffman 1982) and the magnitude of any AVE effect. In addition, he believes that relapse likelihood is also influenced by an individual's expectations regarding drug use, and by the initial effect of the drug once it is ingested in the postcessation period.

Data are available that provide support for Marlatt's model (although cf. Shiffman 1984a). For example, Marlatt's research has recently shown that, among smokers who lapse, those who report responding with global, internal, and stable attributions are more likely to relapse completely than other subjects (Goldstein et al. 1984). In this same research there was also evidence that those subjects who experienced a complete relapse reacted to their initial drug contact with greater guilt feelings than did other subjects. This provides some support for the notion that problematic lapses are associated with an affective reaction as hypothesized by Marlatt. Goldstein et al. presented no data linking the attributional style characteristic of the AVE with the magnitude of affective reaction.

Most data gathered on relapse phenomena are vulnerable to diverse challenges and conflictual interpretations. One reason for this is that relapse data typically involve retrospective self-report, sometimes of target events distant in time from data collection. This renders these data prey to biases such as memory errors and self-presentation distortions. Due to the retrospective nature of much of the data reporting, one bias may be particularly problematic; viz., reports of reactions to relapse crises or initial drug use may be colored by the subject's awareness of his or her subsequent drug use. For example, Goldstein et al. found that lapsers and relapsers were discriminated on the basis of guilt reactions to initial drug use. One could interpret this to mean either that subjects experiencing the greatest guilt went on to relapse, or that subjects who went on to relapse merely reported experiencing the greatest guilt; i.e., knowledge that they had relapsed completely distorted subjects' recall of their affective reaction to initial drug use.

Another problem with research on relapse is that most studies involve self-selection; i.e., the subject population is composed of individuals who voluntarily come forward to provide data.

In the present research we attempted to avoid some of the problems of previous relapse studies by investigating relapse in an identified population of individuals who had gone through a formal cessation program. This permitted us to survey an entire population, thus eliminating one type of self-selection bias. Subjects in our research were self-selected in the sense that they all volunteered for a formal cessation program. Thus, our subjects may not be representative of smokers as a whole.

We attempted to make frequent contact with subjects in order to gather information on initial cigarette use prior to the potentially distorting effects of a successful or unsuccessful resolution of the relapse crisis. Of course, our procedure did not eliminate potential bias; it merely made us susceptible to a different set of biases. Restricting the sample to smokers treated by a single program constrains sample size. Also, data may reflect the effects of the particular treatment used, and subjects" reports to followup interviewers may have been influenced by the subjects' attitudes or feelings about the treatment program.

With the above caveats in mind, this research was intended to characterize the process of relapse with respect to temporal features and cognitive, affective, and physical correlates. Specific questions addressed in this research were: (1) If smoking occurs, what is the latency to sampling a second cigarette, or to returning to regular smoking? That is, what is the time frame in which the overt manifestations of relapse occur? (2) What is the likelihood that a subject will relapse completely if he or she smokes a cigarette? (3) Once a subject relapses completely, what is the likelihood that he or she will achieve a subsequent period of abstinence? (4) What are the cognitive, affective, and physical precursors, and consequences, of an initial post-cessation cigarette? (5) What are the contextual features and activities associated with initial cigarette use? (6) What is the incidence of coping response use after smoking an initial cigarette? (7) What was the frequency and severity of urges prior to the initial lapse? and (8) Is there any relationship between a smoker's precessation characteristics and the timecourse of the relapse process? In addition to characterizing the content of subjects' lapses to cigarette use, we also explored whether any of our dependent measures predicted latency to sample a second cigarette or return to regular smoking.

METHODS

Subjects

The subject pool consisted of 82 persons (47 women and 35 men) recruited from the community to participate in a 2-week smoking cessation program (see Tiffany 1985). All subjects were between the ages of 18 and 40, and had smoked at least one pack of cigarettes per day for at least 1 year. Subjects' mean age was 31.1, mean years smoking was 12.9, and mean number of cigarettes per day pretreatment was 24.4.

Of these 82 subjects, 72 reached complete abstinence by the second week of the cessation treatment. During the 2-year posttreatment followup period, 54 of the subjects reported smoking. Data from their first relapse episodes are reported here.

Procedure

Cessation Treatment. All subjects met in groups of two to six smokers for 6 evenings over a 2-week period. Each meeting consisted of approximately 60 minutes of behavioral counseling and 30 to 60 minutes of aversive smoking. The exact nature of the counseling and the aversive smoking varied across four treatment conditions.

Followup. Following treatment, all subjects were contacted by phone by a research assistant blind to the particulars of the study. An attempt was made to interview subjects at 2-week intervals through 3 months posttreatment, and then monthly, through 12 months. Subjects also were contacted at 18 and 24 months posttreatment. Collaterals, who could provide information about the subjects' smoking, were contacted every 3 months. Structured interviews were used to gather data about subjects' smoking status and problematic situations that they encountered and expected to encounter. If they had smoked at all, extensive information was gathered concerning the relapse episode. Information was also gathered concerning the frequency, severity, and nature of urges to smoke. A relapse interview was completed each time a subject had smoked, after having gone at least 2 weeks without smoking. This report, however, focusses on the first relapse episode only. The interviewers recorded the subjects' free responses to the open-ended questions of the structured interview.

Content Analysis. After 2 years of followup on all subjects, two research assistants were trained to perform a content analysis of subjects' responses to the relapse interviews. Response categories were derived by the authors after reviewing a sample of the interviews. Each research assistant scored approximately 70 interviews. Reliability data were gathered by having both research assistants score 39 of the interviews, and calculating Kappa coefficients for 7 of the interview questions that required the greatest degree of judgment by the scorers. Kappas ranged from .587 for subjects' thoughts following smoking, to .859 for food or beverages consumed prior to relapsing, with a mean of .782.

RESULTS AND DISCUSSION

For the 54 subjects who smoked, the mean number of days between treatment termination and the first relapse episode was 58.44. A second cigarette was smoked by 94.4 percent of these subjects, an average of 13.17 (S.D. = 55.6 days) days after the first cigarette. Approximately half of all subjects (n = 26) had a second cigarette on the same day as their first, and many of these (n = 14) within an hour of their first cigarette. We operationally defined return to daily smoking as three consecutive days of smoking. During the 2-year followup period, 90.7 percent of subjects who smoked a single cigarette eventually returned to daily smoking. The mean number of days between the first cigarette and daily smoking was 41.83.

Of the 49 subjects who returned to daily smoking after their initial posttreatment abstinence, 30.6 percent reported a subsequent, second, distinct period of abstinence during the 2-year followup period. (Only one subject reported a third abstinence period.) There was much variability in terms of the temporal characteristics of the second abstinence period. The beginning of this period ranged from 5 to 288 days after the return to daily smoking, with a mean of 87.53 days and a median of 39 days. The length of the abstinence period ranged from 7 to 652 days (including 4 subjects who remained abstinent through the end of the followup period), with a mean of 178.53 days and a median of 66 days.

At 2 years posttreatment, only 16.6 percent of subjects who had smoked at least one cigarette were abstinent. Of those who eventually returned to daily smoking, 8.2 percent were abstinent, while the 5 subjects who smoked but did not return to daily smoking were all abstinent. The mean 2-year posttreatment smoking rate for all 54 subjects was 19.31 cigarettes per day.

The number of days to first relapse was not correlated with days between the first relapse and the onset of daily smoking, $r(47) = .02$. When the five subjects who never returned to daily smoking were included in the calculations, a modest correlation was found, $r(52) = .35$, $p < .05$.

Characteristics of the Relapse Episodes

Table 1 shows that of the 89 percent of the relapsers who reported the location of their first relapse, a majority of their relapses occurred either at home or at a social event such as a party, or in a bar or restaurant. Other people were present during 56.6 percent of the relapses. In 58.5 percent of all cases, subjects reported that they had noticed others smoking prior to their relapse.

TABLE 1

Location of Relapse

Location (89% Response)	% of Responders
Home	26.4
Work	11.3
Another's Home	11.3
Bar/Party/Restaurant/Entertainment	26.4
In Transit (car, bus, plane, walking)	18.9
Other	5.7

Table 2 displays the self-report of consumption of subjects immediately preceding relapse. Alcohol was associated with nearly one-half of all relapse episodes. This figure is considerably higher than that reported by Shiffman (1982). It is possible that this was caused by either fortuitous sample characteristics or the fact that smokers who consumed alcohol were less likely to call Shiffman's hotline.

TABLE 2

Consumption Preceding Relapse

Consumption (98.1% Response)	% of Responders
None	30.2
Food	11.3
Alcohol	45.3
Caffeinated Coffee/Tea	24.5
Caffeinated Soft Drink	1.9
Recreational Drug	5.6

NOTE: Multiple coding results in totals over 100%.

In nearly all cases, subjects acquired their relapse cigarette through deliberate action. Table 3 demonstrates that only 1.9 percent of the subjects were offered the first cigarette smoked. Social pressure has been reported to be an important determinant of relapse in previous studies (e.g., Marlatt 1982). If the data from our research are representative, this suggests that there is little reason to train subjects in cigarette-refusal skills as has been done with other substance abuse populations. On the average, subjects smoked approximately two-thirds of their first cigarette. Smokers rarely smoked all of the first cigarette they sampled.

TABLE 3

Origin of Cigarette

Origin (96.3% Response)	% of Responders
Bought It	26.9
Asked For It	54.8
Found It	9.6
Was Offered It	1.9
Stole It	5.8

Relapses were distributed throughout the day (Table 4) with most occurring in the afternoon and evening. This pattern of relapse mimics the diurnal pattern of urge/craving self-report volunteered by individuals undergoing smoking withdrawal (e.g., Gilbert and Pope 1982; Glassman et al. 1984).

TABLE 4

Time of Relapse

Time (100% Response)		% of Responders
Morning	(02:00 - 10:59)	7.4
Noon	(11:00 - 12:59)	11.1
Afternoon	(13:00 - 16:59)	27.8
Evening	(17:00 - 19:59)	33.3
Night	(20:00 - 01:59)	20.4

Subjects were asked to recall their mood and physical feelings prior to smoking. Table 5 displays their responses. In keeping with previous studies (Marlatt 1982; Shiffman 1982), most subjects reported that negative affect preceded smoking. Anxiety or tension was reported by 35.3 percent of subjects who answered, while depression/hopelessness, anger/irritation, or boredom/fatigue were reported by most of the remaining subjects. Less than one in five subjects reported any positive affect. Only 77.8 percent of subjects could recall their physical feelings prior to relapse. Of these, as with affect, negative states predominated. In addition, 9.5 percent volunteered that they felt under the influence of alcohol or other drugs.

TABLE 5

Affect and Physical Feelings Preceding Relapse

A. Affect (94.4% Response)	% of Responders
Negative Affect	56.9
Depression/Hopelessness	17.6
Anxiety/Tension	35.3
Anger/Irritation	15.7
Boredom/Fatigue	11.8
Happy/Celebratory/Confident	17.6
Relaxed	2.0
Other (e.g., neutral, nostalgic)	11.8

TABLE 5 (Con't)

B. Physical Feelings (77.8% Response)	% of Responders
Negative/Ill Feelings	31.0
Fatigue	26.2
Headache	2.4
Other Negative Feelings	4.8
Aroused/Agitated	40.5
Under the Influence	9.5
Relaxed	4.9
Neutral	16.7
Other	2.4

NOTE: Multiple coding results in totals over 100% and sums that exceed subtotals.

Responses to Relapse

One-third of all subjects reported using coping responses after relapsing to lessen their chances of further smoking. Overall, subjects used an average of 0.15 cognitive coping responses, and 0.28 behavioral coping responses. The predominant behavioral coping response was to throw out all cigarettes to which the subject had access. Common cognitive coping responses were to think of reasons not to smoke or for the subject to remind himself or herself of how much progress each had made.

When asked about the taste of their first cigarette, 45.3 percent described it in negative terms, 22.6 percent described it as positive, and 32.1 percent said it tasted neutral.

Table 6 lists the cognitive, affective, and physical responses to relapse that were reported by subjects. Over one-third of the subjects did not report or recall any cognitions, and nearly one-half did not report any affective response. The majority of subjects responding reported self-blaming or self-deprecatory cognitions (61.8 percent). Only 2.9 percent said that they admitted defeat or gave up trying to abstain after smoking the first cigarette. Positive thoughts, such as relief that the struggle to abstain had finally ended, were reported by 11.8 percent.

Depression was the most common affective response to smoking reported by subjects (42.9 percent). Only 7.1 percent of subjects described their mood as happy, celebratory, or confident, and only 10.7 percent said they felt relaxed after smoking.

Most of the physical responses to smoking the first cigarette (table 6) appeared to be agonist effects of nicotine (reported by 73.1 percent of the subjects). The most common of these was a feeling of dizzyness or lightheadedness which was reported by about 58 percent of our sample. This figure is congruent with data collected by Gilbert and Pope, who found that slightly over half of the subjects in their laboratory study reported these symptoms upon having an initial postwithdrawal cigarette. The fact that an initial cigarette is likely not to taste good, and is likely to have unpleasant effects, may be useful information to convey in counseling programs with smokers. Other negative physical feelings were reported by 19.2 percent. Only 3.8 percent said that they felt physically relaxed after smoking.

TABLE 6

Cognitive, Affective, and Physical Response to Relapse

A. Cognitions (63% Response)	% of Respondents
Self-Blame/Self-Deprecation	61.8
Vowed "Never Again"	5.9
Admitted Defeat/Gave Up	2.9
Neutral/Indifference	8.8
Relief/Positive Thoughts	11.8
Other Cognitions	17.6

B. Affect (51.9% Response)	% of Respondents
Depression/Hopelessness	42.9
Anxious/Tense	10.7
Anger/Irritation	10.7
Aroused/Excited	7.1
Boredom/Agitated	3.6
Relaxed	10.7
Happy/Celebratory/Confident	7.1
Other	14.3

C. Physical Feelings (96.3% Response)	% of Respondents
Nicotine Agonist	73.1
Dizzy/Light Headed	57.7
Nausea	17.3
"High"	13.5
Tachycardia	7.7
Shaky	1.9
Headache	1.9

TABLE 6 (Con't)

Other Negative Feelings	19.2
Oral Cavity Irritation	7.7
Fatigue	1.9
Other	9.6
Other Physical Feelings	25.0
Aroused/Agitated	3.8
Relaxed	3.8
Neutral	7.7
Other	9.6

NOTE: Multiple coding results in totals over 100% and sums that exceed subtotals.

Prior Urges

Subjects were questioned about the frequency, severity, and effects of urges that they experienced prior to relapsing. Table 7 shows that nearly 80 percent of the subjects reported experiencing one or more urges to smoke per day prior to their relapse. When asked to rate urge severity on a five-point Likert scale where five represented extreme severity, the mean rating was 3.29, between moderate and severe.

Table 8 lists the subjects' responses when asked if and how urges to smoke affected their lives. Only 44 percent of responding subjects reported any effect, and the majority of those stated that urges disrupted their thinking or functioning.

TABLE 7

Frequency, Severity, and Description of Urges Prior to Relapse

Urge Frequency (96.3% Response)	% of Responders
Almost Constant	9.6
Hourly	5.8
Daily	63.5
More Than 2 Per Day	38.5
1-2 Per Day	25.0
Every Other Day	7.7
Every Several Days	3.8
Less Often	9.6

TABLE 8

Effect of Urges on Life

Effect of Urges (92.6% Response)	% of Responders
Urges Didn't Affect Life	56.0
Urges Affected Life	44.0
Annoyance/Irritation	2.1
Negative Mood	16.8
Disruption of Thinking or Functioning	31.4

NOTE: Multiple coding results in subtotal over 44.0%.

Regression Analyses

To reveal associations between characteristics of relapse and outcome measures, exploratory regression analyses were performed. The categorical responses of subjects on the various items were dummy coded and entered as predictor variables in separate regression analyses. Response categories were entered in the regression only if they were endorsed by at least 10 percent of the responding subjects, and if they were among the four most frequently endorsed categories for a given item. Dependent variables were length of time between treatment end and first relapse, length of time to second cigarette, and length of time to resumption of daily smoking. For the latter two analyses, length of time until first cigarette was forced into the regression first as a covariate.

No item significantly predicted days until second cigarette with days until first cigarette partialled out. Only one variable was significantly associated with number of days between treatment end and smoking a first cigarette. The longer a subject maintained abstinence before a lapse, the more likely it was that he or she reported experiencing negative physical feelings (e.g., fatigue, headache) before relapsing ($pr = .34$, $F(1,38) = 5.08$, $p < .05$). Only one variable was associated with the number of days between treatment end and return to daily smoking; viz., subjects who reported that urges affected their life tended to return to daily smoking more rapidly than other subjects; $r = -.31$, $F(1,41) = 4.32$.

Three variables were associated with the length of the interval between smoking a first cigarette and a return to regular smoking. Negative physical feelings preceding first relapse were associated with a shorter time period until the resumption of daily smoking ($pr = -.35$, $F(1,32) = 4.41$, $p < .05$) as was having the first cigarette in the presence of other smokers ($pr = -.37$, $F(1,43) = 6.95$, $p < .05$). Finally, the origin of the subjects' first cigarette significantly predicted time to daily smoking ($sR2 = .06$, $F(2,41) = 3.38$, $p < .05$). Subjects who bought their cigarettes tended to return to daily smoking sooner ($pr = -.30$, $F(1,41) = 4.15$, $p < .05$).

The relationships between a number of pretreatment variables and outcome were also examined. The pretreatment smoking rate was found to be negatively correlated with days from treatment end to daily smoking; $r = -.42$, $F(1,44) = 9.38$, $p < .01$. This relationship persisted when days to first cigarette were partialled out ($pr = -.46$, $F(1,43) = 11.62$, $p < .01$), indicating that a higher pretreatment smoking rate was associated with a quicker return to daily smoking after an initial lapse.

Pretreatment confidence was measured on a five-point scale. Subjects were asked to estimate the likelihood that they would be abstinent 1 year following treatment. This measure was positively correlated only with days until first relapse; $r = .35$, $F(1,51) = 7.02$, $p < .05$. This same measure, taken posttreatment, was similarly predictive of days to relapse; $r = .36$, $F(1,51) = 7.52$, $p < .01$.

Other pretreatment smoking characteristics examined--age, sex, years smoking, number of previous quit attempts, and smoking satisfaction--were not related to any of the outcome measures.

CONCLUSIONS AND IMPLICATIONS

One reason for doing this research was to discover information that might be helpful in developing relapse prevention or intervention treatments; i.e., treatments that are designed to reduce the likelihood of further smoking should a "lapse" occur (see Marlatt 1982). Some data in this study may be helpful in that regard. First, in the majority of cases, relapse to regular smoking does not occur precipitously. In fact, over half of all subjects waited more than 24 hours before having a second cigarette. This suggests that smokers do not rapidly lose control once they sample a cigarette, and it also suggests that there is a substantial temporal window during which to intervene if a lapse occurs. On the other hand, the nearly universal return to regular smoking (91 percent) once a cigarette was tasted suggests that there are powerful forces operative that a relapse intervention program must overcome. It is encouraging that nearly one-third of these relapsers achieved a subsequent period of abstinence. However, their long-term abstinence rate of only 8.2 percent--compared to the 100 percent abstinence rate for relapsers who did not return to regular smoking--lends support to Marlatt's (1982) recommendation that focused intervention occurs after a smoking lapse but before full relapse. Moreover, the negligible correlation between days to a first cigarette and days to full relapse suggests that different factors may influence the maintenance of absolute abstinence versus the prevention of full relapse following initial smoking. For example, maintenance of abstinence might be a function of factors such as confidence/effectance estimates, coping skills, or attributional styles (Hall et al., 1984; Marlatt 1982; Shiffman 1984a). However, once a drug is actually sampled, readdiction may largely reflect the influence of pharmacological motivational systems. Consistent with this is the fact that the best predictor of the latency between a first cigarette and regular smoking was the pretreatment smoking level.

While there are data indicating that coping response execution in the face of an urge to smoke reduces the likelihood of smoking in the relapse crisis situation (e.g., Shiffman 1982), we were concerned with whether coping responses, made after a lapse had occurred, would reduce the likelihood or rate of subsequent relapse on a long-term basis. Our results show that only a small percentage of our subjects used coping responses after a lapse, and that coping response execution was not associated with an increased relapsed latency. It may be that coping responses are more effective if they are executed prior to a lapse. Also, our subjects used fairly primitive coping responses. It may be that more complex or combinatorial coping responses would be more effective (Shiffman 1984b).

There was some evidence ($p < .10$) in our results that putting out a cigarette quickly (having smoked little of it) was associated with an increased interval from a first cigarette until a return to regular smoking. If putting out a cigarette were considered a coping response, it would constitute the only evidence that coping response execution was associated with delayed relapse.

One disappointing aspect of this research is that we were unable to obtain data that strongly supported Marlatt's relapse model. For example, there was no evidence that reacting to a lapse with depression or hopelessness resulted in a worse prognosis than did a different affective reaction. There was a tendency for subjects who were depressed before their relapse to return to regular smoking more rapidly than other subjects ($F(1,39) = 2.88$). However, this finding is difficult to interpret. Prelapse depression might be associated with faster relapse for a variety of reasons: e.g., it might reflect an enduring withdrawal or heightened life stress. Moreover, we found no evidence that particular cognitive responses to relapse (e.g., self-deprecation) were related to relapse rate. Nor was there any evidence that relapse progressed more quickly the longer an individual had been abstinent.

One characteristic of a lapse that is related to the progression to full relapse, is the presence of negative physical feelings prior to the lapse. This is related to a faster relapse progression, and is associated with the relapse of individuals who had been abstinent the longest. The explanation for this pattern is unknown, but it may be that individuals who are tired or ill are simply less able to cope effectively with urges.

One final observation merits comment. Shiffman (1982) questioned the extent to which relapse can be attributed to temporally and situationally discrete incidents, and a person's response to such incidents, versus the tonic factors that render the individual susceptible to relapse. The present research reveals two tonic factors that appear to have been relatively important in determining the rate of relapse: i.e., the presence of chronic urges, and the precessation level of smoking. These factors, in fact, seemed relatively more important in determining relapse rate in our sample than did factors specific to the relapse context: e.g., affective, physical, or cognitive reactions to smoking. Of course, this conclusion, as well as others, must be considered tentative given the constraints of this study--the small sample size, the open-ended interview format, the different reliabilities of response categories, etc. We are now analyzing data yielded by a systematic replication of this research.

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ACKNOWLEDGMENTS

Karen Obremski conducted followup interviews. This research was supported, in part, by the National Heart Lung and Blood Disease Grant #RO1 HL28519.

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Commitment to Abstinence and Relapse to Tobacco, Alcohol, and Opiates

Sharon M. Hall and Barbara E. Havassy

Interest in cross-drug generalities has existed for several years, but there are few data that address such generalities. This is so even though there is a growing body of indirect evidence suggesting that significant commonalities exist. For example, Carroll and Meisch (1984) have demonstrated that food deprivation increases the reinforcing efficacy of diverse drugs in laboratory animals. Falk, et al. (1983) describe environmental features that have similar effects across drugs. Examples are schedules of reinforcement that maintain persistent drug self-administration and drug use as an adjunctive behavior. Kandel and Maloff (1983) note sociocultural similarities in factors influencing use of many drugs--for example, peer group pressure in the initiation of use--and termination of use as a function of changes in demographic status. Similar examples can be drawn from sociological, epidemiological, and psychological perspectives (Levison et al. 1983).

There are two investigations of cross-drug similarities in relapse, both of which have considerable heuristic value. In the first investigation, Hunt and colleagues (1971) compared relapse rates for graduates of treatment programs for alcohol, opiate, and tobacco abuse. The investigators suggested that relapse curves are similar across opiates, alcohol, and tobacco, both in the shape of the curve and in the poor abstinence rates seen at long-term followup. This work has been criticized on several grounds. Sutton (1979) noted that these are typical survival curves that describe many phenomena. The phenomena can be as diverse and unrelated as the death rates of neonates over time in some countries or the time to burn out for individual light bulbs in large batches of bulbs. However, to those in the field who have not seen them before, these data are compelling. They reflect the experience of clinicians in the rapidity of relapse, and the inevitability of it, for users of all three drugs.

A second landmark investigation was that of Marlatt and Gordon (1980), who interviewed 137 subjects about the situations in which they relapsed after treatment for tobacco, alcohol, or opiate dependence. These investigators noted consistency across all three drugs. About one-half the relapse determinants for the three drug categories fell into one of two categories: negative emotional states and social pressure. Negative emotional states were described as relapse determinants for 38% of the alcoholics, 43% of the smokers, and 28% of the heroin addicts. Social pressure was a precipitant for 18% of the alcoholics, 25% of the smokers, and 34% of the heroin addicts. These data raise several critical questions. The first is the extent to which the retrospective nature of the data colored the perception of the event. Second, the extent to which these are illusory correlations is not known. Particular events may have been labelled as determinants of relapse because they were the most salient factors in the situation. The causative factors may have been subtle and less easily verbalized. An example of such a subtle factor is chronic mild withdrawal symptoms. The last question is one of base rates. The categorical scheme used by Marlatt and Gordon (1980) spans the range of human experience. The frequency of such events in the lives of the subjects, independent of relapse, is not known. It is possible that coding of events other than relapse to drugs would show similar distributions of situations.

The goal of the present study was to determine factors related to relapse to three abused drugs: tobacco, alcohol, and heroin. It differed from earlier studies by its prospective nature, by the range of variables investigated, and by attempts to control variables left uncontrolled in previous studies. It was based on a model of relapse that emphasizes commitment, withdrawal symptoms (including negative affect), and environmental support, as determinants of abstinence or relapse (Hall 1980).

This model, the emerging literature on relapse processes, and clinical lore suggest factors which appear to be important in relapse to all three drugs.

Social Support

The first factor is social support, which can be defined as resources provided by other persons (Cohen and Syme 1985). Social support is often conceptualized in two ways. The first is "structural" support. The structural aspect of social support refers to the existence and pattern of relationships with others, for example, marital status, number of relationships, or number of contacts per time period. The second aspect of social support is functional support. This is the degree to which interpersonal relationships provide emotional, intellectual, or material resources. When considering health outcomes, such as maintaining abstinence, both structural and functional aspects of support may facilitate abstinence or, conversely, encourage drug use (Cohen and Wills, in press).

Variables used to measure support differ depending on which aspect of support is being measured. They also differ widely within investigations of specific drugs, as well as across drugs. Most investigations of drugs assess the functional, rather than structural, components of support. These have been shown to predict outcome. Behaviors perceived as supportive by the quitter are consistent predictors of abstinence in ex-smokers (e.g., Graham and Gibson 1971; Mermelstein et al., in press). Positive family environment has been a consistent predictor of outcome in alcoholics (Foster et al. 1972; Finney et al 1980; Moos et al. 1979; Orford et al. 1976).

Evidence for the role of social support in relapse to heroin use is indirect. Marlatt and Gordon (1980) found that social pressure, including direct pressure to use the drug, and being in the presence of others using drugs, was the most frequently reported determinant of relapse to heroin use.

Systems approaches to psychotherapy (e.g., Haley 1971; Bosormenyi-Nagy and Sparks 1973) recognize that subtle forms of social support for drug use may come from families. Therapies developed from these theories have been successfully applied to reduction of drug use during treatment (Stanton et al. 1978), but they have not been specifically applied to relapse. Also, family factors are considered of importance by drug treatment programs, in that provision of family services has been seen to be essential (Coleman 1977; Reed 1985).

Drug users may receive satisfactory general social support, but it may not include specific support for quitting drug use or maintaining abstinence. If network members also have problems with the drug, the support offered may reinforce continued use. Or, if network members are unaware of the user's problem, the support they provide may not be a resource to help them cope with abstinence-related difficulties. The relationship of drug-specific social support to relapse has not received significant attention. Mermelstein et al. (1983) attempted to differentiate global social support from support specific to quitting smoking. Subjects were asked how many of their friends and how many of their coworkers were smokers. The subjects also completed a global social support questionnaire. No clear results emerged when the proportions of smokers among friends and coworkers were compared to smoking status during treatment, at end of treatment, and posttreatment, although differences at end-of-treatment were suggested. Cohen and colleagues (1985) report data that suggest support from intimates for quitting smoking is a determinant of abstinence.

Negative Life Events

A second variable is the occurrence of negative life events, and other global variables, that have been included under the construct of "stress." Stress is frequently operationalized as major life events or changes, both positive and negative. Most research has looked at the effects of stress on global health outcomes. When stress is correlated with health outcomes, negative life events predict poor outcome. Positive events, or scores combining both, usually do not (Mueller et al. 1977; Vinokur and Selzer 1975). Data specific to the addictions has also been reported. Ogbru (1976), Finney et al. (1980), and Cronkite and Moos (1980) all found that negative life changes predicted relapse for alcoholics. Benfari and Eaker (1984) reported similar findings for smokers. Krueger (1981) found events such as recent loss of a relationship or job, depression, interpersonal conflict, or disappointments were associated with occurrence of heroin use by methadone maintenance clients who had been heroin-free for at least 6 months.

The ongoing "stresses" of daily living, repeated or chronic minor events known as "Hassles," appear to be another useful way to characterize stress. Again, most interest has been in the relationship between general health outcome and Hassles. It was suggested that the strain of these daily events cumulatively affects health. DeLongis et al. (1982) investigated the relationship of both Hassles and major life events to health outcomes. Hassles scores were more strongly associated with health than were life events. While Hassles predicted significant proportions of variance when the effect of life events was removed, the reverse was not true. When the effect of life events was controlled, Hassles and health remained significantly related. Although no studies relating Hassles to relapse to drug use have appeared in the literature, the study of such relationships may be fruitful.

Marlatt and Gordon (1980) also noted that 13%-18% of relapse situations for all three drugs could be classified as including interpersonal conflict, a common "stressful" event. In their study, negative emotions were among the most common relapse precipitants. Whether this reflects characterological factors or the occurrence of negative life events is not known. Negative affect is known to be a consistent factor in smoking relapse (e.g., Hall et al. 1983; Pomerleau et al.

1977; Tunstall et al. 1985). Again, whether this affect reflects life events or is characterological is not known.

Sex Differences

There is indication that women smokers and alcoholics relapse more rapidly than men. The U.S. Public Health Service (1980) noted this trend in a comprehensive review of the smoking literature that reported sex differences among treated smokers. Similarly, poorer outcome has been reported for alcoholic women (Davidson 1976), although others dispute the accuracy of this position (Vanicelli 1984). Those few studies that examined sex differences in heroin addicts have not found differences in illicit drug use or treatment outcome variables (Cushman 1978; Savage and Simpson 1980).

An emerging literature suggests that the variables controlling drug use, determinants of relapse, and optimal treatment may be different for women than for men. Women smokers report they are more likely to smoke in response to negative affect than men. The predominance of negative affect smoking among women could be a factor in the higher relapse rates reported for them, since negative affect smokers have been found to be more likely to relapse than smokers who do not label negative affect as a primary determinant of smoking (Pomerleau et al. 1977). The greater role of negative affect in use of alcohol and heroin for women has also been noted (e.g., Beckman 1976; Braiker 1982; Reed 1985; Rhoads 1983; Westie et al. 1984). Others have suggested that the treatments offered, rather than women's characteristics, explain possible differences in outcome. Several writers have suggested that chemical dependency treatment services are not designed for alcoholic or addicted women and may fail to recognize women's key difficulties. If they do recognize these difficulties, they perceive them as outside the scope of services they are willing or able to provide (Reed and Beschner 1981; Carmen et al 1981; Reed 1985). The issue of treatment suitability for women smokers has been little discussed. However, self-quit rates for men smokers are better than for women, suggesting that factors other than treatment structure may be involved in producing differences observed (Pehacek et al. 1982).

Skills to Prevent Relapse

There are other intriguing factors that have been little studied. One is the presence of skills to prevent relapse. Clinicians have long recognized that the ability of patients to eloquently describe their responses to relapse situations is often matched by a lack of coping behavior in actual relapse situations.

Interventions teaching such skills to alcoholics, smokers, and heroin addicts have been evaluated. Most evaluations assessed the effects of training on behavioral performance tests, rather than on relapse prevention (Eisler et al 1973; Foy et al. 1974; Van Hasselt et al. 1978). However, some studies have looked directly at relapse prevention as a function of skill training. Chaney and colleagues (1978) found that providing skill training to alcoholics decreased the duration and severity of relapse episodes at year follow- up. Hall and coworkers (1984) found that smokers given relapse prevention skill training were less likely to relapse than those participating in a discussion control condition. However, the stability of this finding is not clear (Hall et al 1985). Negative results have been reported by Cooney et al. (1982). These treatment studies cannot partial out the unique contribution of skills, because they were part of multicomponent treatment programs.

Commitment to Abstinence

A final variable is commitment to abstinence. Both clinical lore and common sense about the determinants of success suggest that a commitment to abstinence is central to maintenance of abstinence. Commitment to abstinence is one dimension of the broader term, "motivation." We conceptualized it as an indicator of motivation to cease drug use and remain abstinent. Janis (1983) suggests that commitment is central in facilitating adherence to difficult decisions. The decision to remain abstinent may be especially difficult for the chronic drug user.

Studies of smokers who quit smoking without treatment indicate this may be a promising variable, but that it may interact with other variables (Best 1975, 1980). Several dimensions of commitment must be considered. Among the most predictive have been desire for abstinence (Goldstein et al 1983; Rosen and Shipley 1983) and perceived probability of success (Best 1975; Rosen and Shipley 1983; Goldstein et al. 1983). Level of commitment may be directly linked to other variables, such as the perceived costs and benefits of change (Hall 1980) and the client's self-efficacy about maintaining abstinence (Condiotte and Lichtenstein 1981).

Many of these models can be easily adapted to alcohol and opiate abuse. However, data relevant to such adaptations are lacking.

Our Approach

Several consistencies emerge. Despite a need, and despite some theorizing, few data on cross-drug generalities exists. There is evidence for the importance of social support in preventing relapse. Negative life events may increase the probability that relapse will occur. However, it is unclear whether they are causative or whether they are implicated by virtue of selected recall of a relapse situation. There is indication that women relapse at higher rates across drugs. Knowledge about processes underlying sex differences in the relapse process is poor. Coping skills and commitment to abstinence, two variables considered to be central in preventing relapse, have been little studied.

Hypotheses

This paper reports the results of a preliminary study which tested two hypotheses about commitment to abstinence:

(1) Regardless of drug, the greater the commitment to abstinence, the longer the time to relapse; and

(2) Negative mood, withdrawal symptoms, and negative life events would interact with level of commitment to abstinence over time to relapse. We predicted that at high levels of commitment these variables would not affect outcome. At lower levels, the higher the level of these negative subjective events, the shorter the time to relapse.

Differences in time to relapse between drug treatment classes were not expected.

In this preliminary study, relapse was defined as 1 week of daily use of the problem drug.

METHOD

Treatment Facilities

Subjects were drawn from three drug groups: opiate addicts completing 21-day methadone-assisted detoxification or 28-day residential treatment, alcoholics completing 28-day residential treatment, and smokers completing 28-day cessation treatment.

The treatment facilities from which we recruited subjects were selected for four reasons. The first was treatment goal. All the treatment programs chosen were abstinence oriented. The similarity of goal allowed us to better assess the common effects of central variables. The second was the nature of the treatment episode, which lasted about 1 month, and had a well-defined ending date. This similarity eliminated length of treatment as a confounding variable. Third, we selected treatment modality groups in which there were enough clients to obtain an adequate sample. The fourth was that the facilities treated subjects who were representative enough of the populations within drug group so that the data obtained would be meaningful, while allowing us to roughly equate drug treatment classes on demographic characteristics.

Our research group offered a smoking treatment program at San Francisco General Hospital, a large public hospital which serves a multiethnic, lower and working class population. The program was offered at this location because both a drug treatment and an alcohol program included in the study were at the hospital, facilitating the acquisition of subjects with similar demographic characteristics. Treatment included aversive smoking and group discussion and support. Groups were led by one of two therapists. Although the treatment was uniform across the groups, the therapists had different orientations, providing for some variability in treatment delivery.

Alcoholics were recruited mostly from two residential programs. Both used Alcoholics Anonymous extensively in treatment. Clients were primarily lower-middle and working class and were from a variety of ethnic groups.

We recruited opiate addicts from four sources: three 21-day detoxification clinics, and one 28-day residential facility. The outpatient clinics provided methadone detoxification and supportive counseling. The inpatient program was based on an adaptation of the abstinence-oriented Alcoholics Anonymous model. Again, the programs treated lower-middle and working class clients of diverse ethnic groups.

Subjects

Subjects were blacks and whites between 21 and 50 years of age, who had been employed within the 6 months before the beginning of treatment and who gave adequate data for followup contact. Subjects were of low to middle socioeconomic status (SES) and were not upper-middle or upper SES, destitute, or homeless. The primary source of income for all subjects was legal.

Here, we report data on the first 77 subjects to enter the study. Data have been collected on 230 subjects, about equally distributed among the three drug groups. Descriptive statistics for the first group of 77 are shown in table 1.

TABLE 1

Descriptive Statistics

		TOBACCO	ALCOHOL	OPIATES
SEX	M	18	25	11
	F	12	4	7
ETHNICITY	WHITE	27	22	14
	BLACK	3	7	4
MARITAL STATUS	NEVER MARRIED	18	8	5
	MARRIED	6	9	6
	SEPARATED	1	4	2
	DIVORCED	5	8	5
EMPLOYMENT STATUS	EMPLOYED	26	13	5
	ON LEAVE	1	2	0
	UNEMPLOYED	2	11	8
	STUDENT, NOT IN JOB MARKET, OTHER	1	3	5
AGE	$\bar{X}$ =	35.03	30.34	34.78
	SD =	7.68	5.53	7.31
AGE AT FIRST USE	$\bar{X}$ =	14.23	14.69	19.17
	SD =	4.35	2.87	5.76
AGE AT REGULAR USE	$\bar{X}$ =	16.58	20.79	21.94
	SD =	3.83	7.15	5.73

Method

Study Induction. Subjects were recruited at their treatment site when in the last third of treatment. Only clients who had acceptable attendance and were abstinent were recruited. Abstinence was verified by two biochemically validated self-reports at least 72 hours apart. Clients agreeing to participate underwent a screening procedure and completed an informed consent. A study intake assessment, which was administered just before the client completed treatment, included an interview assessing demographic characteristics, health status, and treatment history; and instruments measuring drug and alcohol use, mood, withdrawal symptoms, life events, and motivation about drug use.

Followup. Followup assessments were completed once a week for 12 weeks (beginning with the first week following treatment end) or until the subject relapsed. Subjects' drug and alcohol use, moods, and withdrawal symptoms were monitored during followup. Social support data were also collected at the followup assessment. We recognized this procedure could confound perceived social support with early progress. That is, support by others may vary as a function of cues from the subject about probability of continued abstinence during treatment or very soon afterwards. However, all alcohol and some opiate clients were recruited from inpatient facilities. They could not estimate social support from their environment until they returned to it.

Measures. The following instruments were used in the present study:

(1) A precoded intake interview, measuring demographic variables, addiction and treatment history, treatment goals, and physical health.

(2) A scale measuring Commitment to Abstinence was adapted from that used by Marlatt (unpublished). The scale asked subjects to rate a) desire to be abstinent, b) perceived chances of success, and c) perceived difficulty of abstinence, on a 1-10 point scale. Subjects were also asked to endorse one of five abstinence goals, which are shown as goals 2 through 6 in table 2.

TABLE 2

Abstinence Goals

1. No clear goal.
2. Controlled use.
3. Total abstinence for a time, then decide about use.
4. Use occasionally, but not a habit.
5. Give up once and for all, but realize I may slip.
6. Give up once and for all, be totally abstinent, never use again.

(3) A scale measuring *chronic withdrawal symptoms* (Symptoms Questionnaire) was adapted from existing scales measuring alcohol, tobacco, and opiate withdrawal symptoms.

(4) The *Mood Questionnaire* (Ryman et al. 1974) was shortened and adapted for our population.

(5) The *"Hassles" scale* (Kanner et al. 1981) was shortened for use with our population.

For smokers, self-report of abstinence was verified by expired air carbon monoxide readings of 9 ppm or less. Self-report of abstinence for alcoholics was absence of alcohol in urine specimens. Report of abstinence by opiate addicts was verified through absence of morphine in urine specimens. Urinary alcohol and morphine were assayed by a commercial laboratory. The accuracy of the morphine assay has been judged acceptable by the State of California as part of its laboratory monitoring program for drug treatment programs. There was no independent verification of the accuracy of the alcohol assays available to us.

Results

Overview. The small and incomplete sample suggests that a generous probability level, for example, $p < .10$, would be appropriate. On the other hand, because of the small sample size, conservative statistics, including hierarchical regression analyses by sets, could not be used. Data analysis therefore required more tests than ideal. As a compromise, we retained the $p < .05$ significance level. Interpretation of the results should be considered tentative given the incomplete sample size, and the less-than-optimal data analysis strategy required.

Commitment to Abstinence and Time to Relapse. Each of the four commitment to abstinence ratings was entered as an independent variable in a series of hierarchical regressions with drug group as the covariate. Time to relapse was the dependent variable in each.

The first hypothesis was supported. Of the four dimensions of commitment to abstinence, two of these, goal and perceived difficulty, were significant predictors of time to relapse in this small sample.

A goal of total abstinence versus partial abstinence was a significant predictor of time to relapse ($F[1,69] = 4.16$, $p < .05$, $r^2 = .0453$), independent of treatment class. As is shown in figure 1, subjects who endorsed the most restrictive goal, "I want to quit (drinking) once and for all, to be totally abstinent, and never (drink another drink) again for the rest of my life," had longer times to relapse than did subjects committed to the other alternatives combined. The selection of "total abstinence" as a goal also predicted relapse versus continued abstinence. At 12 weeks, 63% of those selecting this goal were abstinent. Less than 30% of those choosing other goals were abstinent (Fisher's Exact $p < .008$). The interaction between treatment class and commitment to total abstinence was not significant.

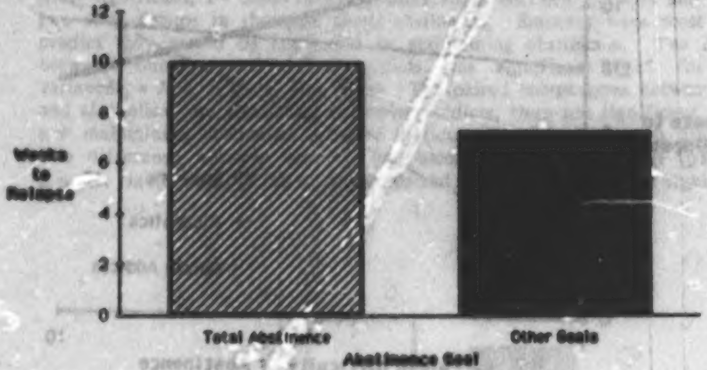

FIGURE 1

Weeks to Relapse as a Function of Choosing a Goal of Total Abstinence Versus Choosing Other Goals

The interaction between perceived difficulty of abstinence and treatment class was significant ($F[2,65] = \underline{p} < .01$, $r^2 = .12$). For smokers, perceived difficulty and time to relapse were negatively correlated ($\underline{r} = .515$, $\underline{p} < .01$). For alcoholics, there was no correlation ($\underline{r} = .062$). For opiate addicts, greater perceived difficulty predicted longer time to relapse ($\underline{r} = .570$, $\underline{p} < .01$). Regression lines of time to relapse as a function of perceived difficulty for each treatment class are shown in figure 2.

Desire to quit and likelihood of success were not significantly related to weeks to relapse.

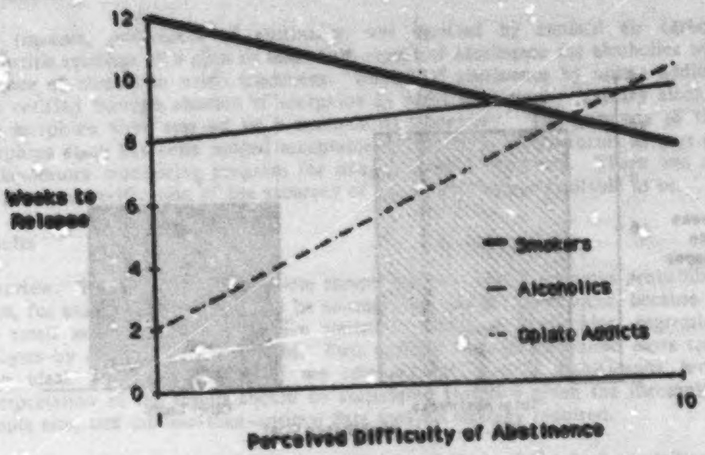

FIGURE 2

Regression Lines for Drug Treatment Classes: Weeks to Relapse as a Function of Perceived Difficulty of Abstinence

Sex Differences, Hassles, Withdrawal, Moods, and Abstinence. The hypothesized interactions were not found. A series of hierarchical regressions were completed with treatment condition, abstinence ratings, sex differences, Hassles scores, and mood scores entered as independent variables. Interaction terms were entered last. There were no significant interactions of abstinence scale values with sex of subject, Hassles, withdrawal symptoms, or moods.

Drug Treatment Class, Time to Relapse, and Relationships among Independent and Moderating Variables. Contrary to expectation, there were differences in treatment class in time to relapse ($F[2,74] = 5.91$, $p < .01$, $r^2 = .13$). For opiate addicts, mean = 6.11 weeks, SD = 4.14; for alcoholics mean = 8.66 weeks, SD = 5.04. For cigarette smokers mean = 10.37 weeks, SD = 3.59. Only differences between smokers and opiate addicts were significant ($t[46] = 3.75$, $p < .01$).

To better understand factors that might mediate differences in time to relapse across the three drug groups, we compared the groups on mean negative mood states following treatment, Hassles scores, withdrawal symptoms following treatment, and commitment to abstinence in a series of exploratory analyses.

Significant differences were found between the three drug groups on expectation of successful abstinence ($F[2,74] = 4.71$, $p < .01$, $R^2 = .11$), predicted difficulty in maintaining abstinence ($F[2,74) = 3.06$, $p < .05$, $R^2 = .076$), goal of total abstinence versus other goals ($F[2,74] = 3.43$, $p < .04$, $r^2 = .084$), and withdrawal symptoms ($F[2,74] = 6.30$, $p < .01$, $R^2 = .145$). Differences between total Hassles score, negative mood states, and desire to maintain abstinence were not significant.

Most significant, F-values reflected differences between smokers and the other two drug groups in thoughts about abstinence. Smokers were most likely to predict they would be successful in maintaining abstinence. The difference between smokers and opiate addicts was significant (t[25 for unequal variances] = 2.52, $p < .01$, figure 3a). The paired comparisons between smokers and alcoholics, and alcoholics and opiate addicts, were not significant. Smokers saw maintaining abstinence as more difficult than the other two drug groups. The difference between smokers and alcoholics was significant ($t[57] = 2.59$, $p < .01$, figure 3b), but the other two paired comparisons were not significant.

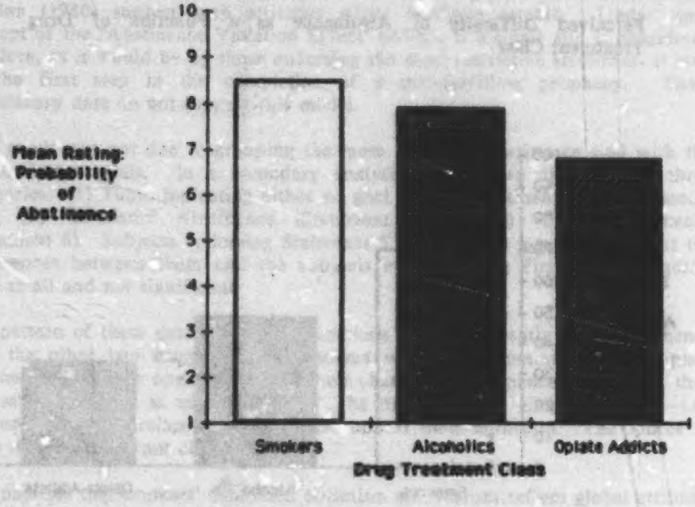

FIGURE 3a

Probability of Successful Abstinence as Predicted by the Three Drug Treatment Classes

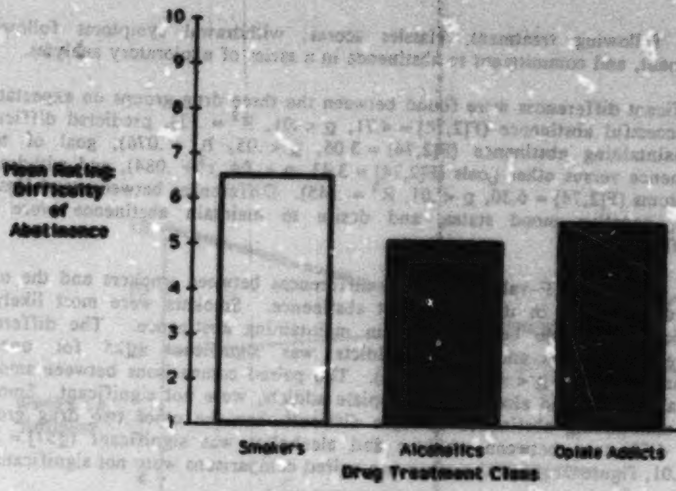

FIGURE 3b

Perceived Difficulty of Abstinence as a Function of Drug Treatment Class

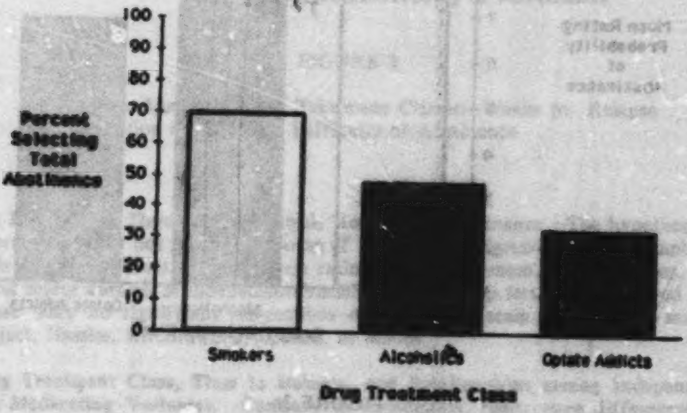

FIGURE 3c

Percent of Subjects Selecting Total Abstinence as a Goal for Each Drug Treatment Class

Smokers were more likely to select total abstinence as a goal than the other two treatment classes. The difference between smokers and opiate addicts was significant ($t[46] = 2.59$, $p < .01$, figure 3c). The remaining two paired comparisons were not significant.

Opiate addicts reported significantly higher levels of withdrawal symptoms (mean = 43.66, SD = 21.91) than both smokers (mean = 28.67, SD = 16.61; $t[46] = 2.69$, $p < .01$) and alcoholics (mean = 25.36, SD = 16.06; $t[45] = 3.30$, $p < .01$). Because time to relapse differed, the length of time over which symptoms were measured differed among the three groups. Therefore, an analysis of covariance was completed with time to relapse removed from the equation. Differences in withdrawal symptoms remained significant.

DISCUSSION

The results confirm the first hypothesis. Independent of drug group, if subjects endorsed a statement indicating that they intended to be abstinent and never use the problem drug again, they were slower to return to daily drug use. They also were more likely to be abstinent at the end of 3 months. On the one hand, this is not surprising, since individuals' prediction of their own behavior is often good (Condiotte and Lichtenstein 1981). On the other hand, some might consider an intention never to use a drug again to be an unrealistic one. Marlatt and Gordon (1980) suggest such attitudes might facilitate relapse. Under their concept of the "Abstinence Violation Effect" (AVE), if a single slip is considered a failure, as it would be by those endorsing the most restrictive statement, it may be the first step in the completion of a self-fulfilling prophecy. These preliminary data do not support this model.

This result was not due to grouping the more moderate abstinence goal with the nonabstinence goals. In a secondary analysis, goals were divided into three categories: (1) Those indicating either no goal or a nonabstinent goal (statements 1-4); (2) "Realistic" Abstinence (Statement 5); or (3) "Total" Abstinence (Statement 6). Subjects endorsing Statement 5 relapsed the most rapidly, but the differences between them and the subjects endorsing the first four categories were small and not significant.

The pattern of these data suggest that smokers think differently about abstinence than the other two drug groups. Smokers were more committed to complete abstinence and more optimistic about their chances of abstinence. However, they also saw abstinence as more difficult. The differences in time to relapse--i.e., the longer time to relapse for smokers--support their optimism. The source of these differences is not clear.

It is possible that smokers' combined optimism and realism reflect global attitudes toward treatment. Smokers who enter treatment may have more faith in it than do members of the other two drug treatment classes. It may be that a "smokers subculture" is not one which devalues some forms of treatment, as may be the case for some alcoholics and heroin addicts (Brown et al. 1972, 1975; Sutker et al. 1978). Also, the data show the smokers have tried to quit fewer times and therefore have had fewer failure experiences. Failure may breed more failure as confidence in one's ability to quit is decreased by negative experiences.

The data indicate few differences between drug groups on subjective experience during the post-treatment followup period. The classes do not differ significantly on negative moods or on day-to-day life stresses (Hassles). Opiate addicts do report more withdrawal symptoms than do members of the other two groups.

The interactions we expected to find between negative subjective experience during the posttreatment period and level of commitment to abstinence are not yet detectable. A larger sample size may be needed to detect such differences, if they are present.

These are preliminary data. As such, interpretations of them must be regarded with considerable caution. They do seem to indicate that commitment to abstinence, a little studied factor, may be a fruitful variable to address. While other variables--such as stress, affect, and life events--are perhaps more fashionable, their potential as predictors has not yet been realized in this study.

It is of theoretical interest to know that certain ways of thinking about abstinence may increase the probability of maintaining it. This knowledge is of little clinical utility unless it can be translated into behaviors that prevent relapse in risky situations or those that prevent the client from ever entering such situations. Such specific knowledge may ultimately lead to useful therapeutic techniques. Similarly, factors leading to the development of this way of thinking and the therapeutic and environmental events that control it should be explored.

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ACKNOWLEDGMENTS

Research reported was funded by National Institute on Drug Abuse Research Grant Number R01-DA-03082 and ADAMHA Research Scientist Development Award K01-DA-00065.

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Explaining Relapse to Opiate Addiction Following Successful Completion of Treatment

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INTRODUCTION

Relapse is a central aspect of the concept of opiate addiction (Lindesmith 1968; Catalano and Hawkins 1985). The inability to stop opiate use is what most people have in mind when they say that someone is "addicted" to opiates. During their careers, most opiate addicts in fact seek primary drug-user treatment to help them stop opiate use (McAuliffe 1975). Many achieve abstinence on their own or by successfully completing some form of primary treatment, be it simple detoxification, counseling, therapeutic community, or methadone maintenance. Unfortunately, followup studies have found relapse rates to be around 50 percent for methadone maintenance graduates (Brown et al. 1975; Cushman 1974; Lowinson and Langrod 1973; Riordan et al. 1976; Stimmel and Rabin 1974), about 66 percent for those who completed outpatient methadone detoxification (Maddux et al. 1980), 10 percent for therapeutic community graduates (Smart 1976), and between 50 percent and 90 percent for discharges from the Public Health Service Hospital in Lexington, Kentucky (O'Donnell 1965; Stephens and Cottrell 1972). Most opiate addicts relapse repeatedly over their disease course, even after substantial periods of abstinence (McAuliffe 1975; Waldorf 1973). Consequently, many theorists (e.g., Lindesmith 1968; Wikler 1965) now regard the tendency to relapse as one of the defining characteristics of addiction.

Despite the conceptual importance of relapse and the great economic and human cost of cycles of repeated treatment and re-addiction, relatively few researchers have studied the causes of relapse as distinct from the causes of treatment failure. Most field studies of relapse to date have focused on measuring the frequency of relapse or its timing (e.g., O'Donnell 1965; Hunt and Bespalec 1974). A much smaller number of empirical studies have sought to discover the predictors and causes of relapse (e.g., Alksne 1955; Ball and Snarr 1969; Brill et al. 1972; Brown et al. 1971; Joe and Simpson 1983; Jorquez 1983; Maddux and Desmond 1981; McAuliffe 1982; Simpson et al. 1979; Stephens and Cottrell 1972; Vaillant 1969; Waldorf 1973, 1979, 1983; Wikler and Pescor 1967; Willie 1983; Winick 1962, 1964).

Most of these pioneering studies have been retrospective or cross-sectional in design. Some researchers (e.g., Alksne et al. 1955; Brill et al. 1972; McAuliffe 1982; Waldorf 1973) simply asked long-term addicts why they had relapsed, and then summarized the responses statistically or in a theory of relapse. Other researchers (e.g., Winick 1962) correlated demographic variables with patient outcomes and then speculated about the meaning of the results, e.g., interpreting the relationship between age and relapse as a matter of maturation or burnout. Although valuable first steps for generating hypotheses, retrospective studies are vulnerable to after-the-fact rationalization by the subjects themselves, as well as biases in the sampling frame (Robins 1966), and demographic correlations with relapse are open to varying interpretations.

The studies to date have produced promising hypotheses and causal models (e.g., Marlatt and Gordon 1979; Catalano and Hawkins 1985; Milkman et al. 1983/1984), but few have attempted to explore these models systematically. Many of the statistical studies have examined the relationship of one measure at a time with relapse (e.g., Winick 1964). Other statistical studies of relapse have used multivariate methods but have often employed exploratory or prediction-oriented model specification methods, such as step-wise regression, that select variables solely on statistical rather than theoretical for testing theoretical models. The recent study by Jose and Simpson (1983) represents an important early attempt to investigate relapse using multivariate statistical models specified theoretically, although the authors apparently had to rely on existing measures as indicators rather than on measures specifically designed for this purpose.

The present study sought to build upon the previous studies. Prospective in design, it measured concepts from several leading theories of relapse at the point of the subjects' satisfactory completion of treatment, and then re-interviewed the subjects at 6 months and 12 months to determine the extent of relapse to opiate use. Since the study is not yet completed, this report describes the study's implementation to date and presents preliminary findings regarding conditioning models of relapse from the baseline (at discharge from treatment) and the 6-month followup data obtained thus far.

METHODS

Recruitment Plan and Followup

The 184 subjects for this study included four types: 1) "imminent completers" (67 percent) or 2) recent completers (14 percent) of treatment programs for opiate addiction; 3) completers of after care programs (12 percent); and 4) long-term clients of open-ended drug counseling (7 percent). For the purpose of this study, "completers" are persons discharged from treatment on recommendation of treatment staff. Interviews were conducted within an average of 1 week before or after discharge. Since outpatient drug-free counseling tends to be open-ended, the research design assumed that clients who had been doing well in counseling for 6 months or more were equivalent to other treatment completers; clients from open-ended aftercare programs were treated similarly. Addicts in corrections facilities were eligible only if they were completing a prison-based drug treatment program.

Recruitment began in the spring of 1981 and included a large number of treatment programs in the Boston and surrounding areas (47 programs in all). Staff contacted each program frequently to determine when an opiate-addicted client would be completing treatment. In order to insure a wide variation in the hypothesized causes of relapses, the recruiters tried to obtain approximately equal numbers in the eight-cell design presented in table 1. The design assumes a rough correspondence between levels of three broad factors that are thought to be related to recovery: time since last period of physiological dependence, psychological adjustment (motivation, attitude), and social adjustment (resources and stability). Since the factors were measured only after a subject was recruited, we assumed that the clients from particular modalities would approximate the characteristics of particular cells. As table 1 shows, while some cells were clearly harder to fill than others, we have obtained a sample of subjects who have a wide range of treatment experience and therefore should have ample variation in relapse experiences and their causes. All subjects provided baseline data on hypothesized causes of relapse and background characteristics during a 2-hour interview.

We have thus far achieved good results in obtaining 6-month followup data on these 184 subjects. All of the subjects have reached their 6-month anniversaries: 94 percent have provided followup data, 2 percent refused or could not be located, and 4 percent are overdue but still being pursued. To obtain this response rate, the research staff employed the same persistence and field techniques developed and used successfully by previous addict researchers (Nurco et al. 1977; Robins 1966; Robins et al. 1974; Maddux and Desmond 1981; Bale et al. 1984).

RESULTS

Demographic Characteristics

As one would expect for a sample of treatment graduates, including ones from pain clinics and aftercare programs, this sample is somewhat older, better educated; and more often employed, non-minority, and married than the typical opiate addict sample. Of the 184 subject, 71 percent were males. The samples' median age was 32 years old, with a range from 21 to 63. The subjects had attended a median of 12.3 years of school, with one having attended as few as 3 years while another had attended as many as 4 years of graduate school. At the time of the interview, 59 percent of the subjects were working, but 77 percent had worked some of the immediately preceding year (a median of 6.6 months). Of those 75 subjects who were unemployed, one-third were either disabled (n=11), receiving welfare (n=1) or workmen's compensation (n=3), in school full time (n=6), supported by spouses (n=2), receiving prolonged severance pay (n=1), or had a job waiting for them on discharge (n=1). The sample's median occupational prestige score for the current or last job held was 32.8, which is approximately the score for a truck driver (Featherman et al. 1975). Whites comprised 79 percent of the sample, blacks 18 percent, and Hispanics 3 percent. Forty-nine percent of the sample were single, 22 percent married, 28 percent separated or divorced, and 1 percent widowed.

Drug Addiction History

The sample members were all primary opiate addicts. They had first been opiate-addicted a median of 9.3 years prior to the baseline interview (range = 0.3 to 25.3 years). Of course, many had intervening periods of abstinence--voluntary or involuntary--and periods of intermittent drug use. When these periods are excluded, the average "net" length of addiction was 4.5 years, with a range from 2 months to 16 years. During the year prior to the baseline interview, the subjects used illicit opiates a median of 98 days. Seventy-five percent of the subjects began opiate drug use for the reasons usually cited for recreational addiction (to get high, curiosity, to go along with others); the rest cited medical reasons.

TABLE 1

Recruitment Design: Programs, Sample Size, and Percent of Entire Sample

Psychological Adjustment	Time Since Dependence: Short (less than 3 months) Social Adjustment: Low	Time Since Dependence: Short (less than 3 months) Social Adjustment: High	Time Since Dependence: Long (3 months or more) Social Adjustment: Low	Time Since Dependence: Long (3 months or more) Social Adjustment: High	TOTAL
High	Methadone Maintenance	Pain Clinic	Therapeutic Community	Aftercare	
	12 (6%)	24 (13%)	42 (23%)	27 (15%)	105
Low	Public In-patient Detox (30)/ Out-patient Short-term Methadone Detox (3)	Private, Inpatient Detox in Psychiatric Hospital	Corrections Drug Counseling	Outpatient Drug Free	
	33 (18%)	31 (17%)	5 (3%)	10 (5%)	79
TOTAL	45	55	47	37	184

Note: Cell entries are 1) the modality of treatment, 2) the number of subjects recruited from that modality, and 3) the percentage of the entire sample recruited from that modality.

Extent of Relapse at 6 Months

As reflected by differences in definitions across studies in this volume, the precise meaning of "relapse" may vary widely. This chapter assumes that, theoretically, relapse during the followup period is a continuous variable ranging from complete abstinence to daily use. Although abstinence and relapse are categorical concepts in layman's terms and in some of the early scientific literature (e.g., Ray 1961), recent research (e.g., Zinberg and Jacobson 1976; Kurland et al. 1969; McAuliffe et al. 1985a) has shown that drug use by addicts following treatment may assume a variety of patterns covering the entire continuum of use. Moreover, the operant and respondent conditioning model of opiate use that guides this research (McAuliffe and Gordon 1980; McAuliffe and Ch'ien 1986) views addiction as a quantitative variable reflecting the strength of the drug-taking response. A continuous concept of relapse has the advantage of including the entire range of opiate use outcomes. The present authors hold that it makes little sense to consider any recurrence of a chronic disease as a complete failure to treatment; a more realistic approach is to view amelioration rather than cure as the goal of drug treatment. If so, extent of opiate use during followup reflects the degree of relapse.

Consistent with this theoretical view, this chapter employs two operational definitions of relapse: 1) the number of days of opiate use during 6 months following completion of a treatment program, and 2) a series of ordered categories summarizing the amount of opiate use during the 6 months as shown in table 2. While both measures are based on the same data, the first measure describes the central tendency of the responses, whereas the second describes their overall distribution. The validity of these "behavioral" measures was demonstrated in our previous research (McAuliffe et al. 1985a), and in methodological research by others (Amsel et al. 1976; Bale 1979; Maddux and Desmond 1975; Pompi and Shreiner 1979; Stephens 1972). In the present study, however, we tested the measures further by correlating them with seven-point semantic differential items indicating the extent of being "addicted" verses "non-addicted" and the extend "on opiates" and "off opiates" at followup. (For baseline versions of these measures, see items 3 and 4 in table 3 below.) The correlations were .56 and .71 respectively, indicating a statistically significant degree of convergent validity (Campbell and Fiske 1959) between the behavioral measures and the semantic differential measures of relapse at followup.

Inspection of table 2 reveals a wide range of relapse experience over the modalities of treatment. At one end of the continuum, a majority of the clients completing publicly funded short-term detoxification program (PDX) had periods of daily opiate use, whereas at the other end almost all of the clients in aftercare (AFT) and outpatient drug-free programs (OPDF) were entirely abstinent or had only rare slips during the 6-month followup period. The mean days of opiate use was 31 for the entire sample, and ranged from 4 to 83 across modalities, reflecting statistically significant variation in opiate use during followup over modalities of treatment. It is also notable that the relapse experiences of the clients treated in particular modalities coincided reasonably well with our sampling design based on the time since detoxification and our judgment about the social and psychological characteristics of clients the different programs graduated.

TABLE 2

Outcome of Followup at 6 Months by Modality

	Time Since Dependence							
	Short (less than 3 months)				Long (3 months or more)			
Outcome	Public Detox (PDX)	Methadone Maintenance (MM)	Private Psychiatric Hospital (PSY)	Pain Clinic (PAIN)	Corrections (CORR)	Therapeutic Community (TC)	Outpatient Drug-Free (OPDF)	After-Care (AFT)
Abstinent or Rare Slips (less than 6 days)	% 28	% 50	% 46	% 70	% 80	% 82	% 90	% 89
Occasional Use (6 to 25 days)	3	9	7	4	0	3	0	3
Regular Use (26 to 104 days)	7	8	18	17	0	0	0	4
Daily or Near Daily (105 to 180 days or min. 2 x's daily). Refusal.	62	33	29	9	20	15	10	4
	100	100	100	100	100	100	100	100
Mean Days of Opiate Use	83	57	47	23	37	21	6	4*
n	29	12	28	23	5	39	10	27
In process	4	0	3	1	0	3	0	0
	33	12	31	24	5	42	10	27

* Differences across all modalities is significant at the .001 level

TABLE 3

Correlations Among Measures of Psychological Addiction at Baseline

Measure (coding)	Correlations 1	2	3	4
1. How often do you feel a craving or need for opiates? (8=several times a day; 0=never)	—			
2. Are you currently psychologically addicted to or dependent on opiates? (1=yes, 0=no)	.64	—		
3. Myself as I am today: (7=addicted; 1=non-addicted)	.49	.56		
4. Myself as I am today: (1=off opiates; 7=on opiates)	.45	.47	.64	
5. Number of days of illicit opiate use during the year prior to interview	.45	.33	.35	.27

Note: n = 143 for all correlations, due to individual item non-response. All of the correlations are significant at the .001 level.

Conditioning Theories of Relapse

Conditioning theories provide a common background for several major models of relapse (Lindesmith 1968; McAuliffe and Gordon 1980; Vaillant 1969; Wikler 1965), but these models differ in the emphasis they place on particular reinforcing stimuli. This chapter will examine data that are relevant to this issue.

Craving at Discharge

Before considering the question of which reinforcing and conditioned stimuli are most important in the relapse process, the analysis will first estimate the common causal assumption of these models--that the extent of relapse is a function of the degree of addiction. Addiction in these analyses is assumed to be reflected by the extent of craving, which the questionnaire measured by asking, "Right now, how often do you feel a craving or need for opiates." The questionnaire format allowed answers ranging from "never" (scored 0) to "more than once a day" (scored 5). The mean craving response at baseline (discharge) was 2.2, which represents slightly more than once per week. However, 31 percent of the subjects said they never craved, while another 31 percent said they craved opiates more than once a day.

The validity of the craving measure was tested by correlating it with several other questionnaire items measuring addition at baseline (table 3). A variety of items measuring the same concept was included in the questionnaire to insure reliability and to measure the extent to which the scores vary depending on differing response formats. As table 3 shows, the craving measures, two of which (2 and 3) ask about addiction directly and two of which (4 and 5) ask about the cause of addiction (opiate use). The overall consistency between the different measures indicates that they appear to focus on the same underlying concept.

A goal of any treatment for opiate addiction, regardless of its theoretical underpinning, is to reduce craving. ("Addiction" in this chapter is defined as a psychological rather than a physiological state.) Table 4 reveals that modalities differ significantly in the extent to which they have eliminated their clients' craving and psychological addiction by discharge (see item 2 in table 3 for description of psychological addiction). Those discharged from short-term programs, including public and private inpatient detoxification programs and pain clinics, had high craving rates. The relatively low percentage of pain patients admitting to psychological "addiction" may be a reflection of pain clinics' ideology, which denies that their patients are "addicts" while allowing that the patients are "drug dependent." Despite long periods in treatment, subject from methadone maintenance programs were usually detoxified immediately before the baseline interview and consequently were experiencing craving as often as the short-term patients. By contract, clients from the long-term drug free programs (OPDF, AFT, TC), even programs located in prisons (CORR), reported much lower levels of craving and psychological addition than did clients from short-term programs. It is noteworthy that all long-term clients were either outpatients, halfway house, or re-entry facility residents. By contract, all the recently detoxified clients, except methadone maintenance graduates, were inpatients. Thus, the recently detoxified clients reported more craving than did the long-term clients, even though at the same time of the interview the recently detoxified group was much less exposed to environmental cues that might cause craving than was the long-term group.

TABLE 4

Craving by Type of Program

Type of Program	Mean Frequency of Craving[a]	% Psychologically Addicted	n
Public Detoxification	3.4	66	29
Methadone Maintenance	3.3	73	12
Private Psychiatric	3.2	61	28
Pain Clinic	2.3	29	24
Corrections	2.0	50	4
Outpatient Drug Free	1.7	44	10
Aftercare	1.0	26	27
Therapeutic Community	1.0	13	39
TOTAL	2.2	41	173
Significance	p <.01	p <.01	

[a] Craving scale: 0 = never, 1 = less than once a week, 2 = once per week, 3 = several times a week, 4 = once a day, 5 = more than once per day.

The obvious correspondence between the rates of craving in table 4 and relapse rates across modalities in table 2 suggested the need to examine the relationship between craving and relapse directly. Bivariate regression analysis found that the extent of craving explained a significant amount of the variation in relapse (the standardized regression coefficient was .30, $p < .001$), and the relationship remained significant when the effects of the individual modalities of treatment were controlled statistically (standardized $b = .16$, $p < .05$).

The Causes of Craving

Since craving at discharge and the extent of relapse at followup appear to be related, as conditioning theories suggest that they would be, one naturally turns to consideration of what the precise cause of craving is. Conditioning theory itself is neutral on this point, since a response such as drug taking may be reinforced in a variety of ways (Carr 1984; McAuliffe and Gordon 1980; McAuliffe et al. 1985b). Consequently, a variety of conditioned cues may stimulate craving, and theorists differ on which cues are most important. On the one hand, some authors (Lindesmith 1968; Wikler 1965; O'Brien et al. 1981) view relief and avoidance of withdrawal sickness as the most important source of reinforcement for chronic opiate use. They have emphasized conditioned withdrawal and cues similar to withdrawal as factors in causing relapse. Lindesmith (1968), for example, speculated that avoidance of withdrawal distress by opiates generalizes to avoidance of any distress, and that long after detoxification, addicts may return to opiate use in response to distress of various kinds.

On the other hand, McAuliffe (1982) and McAuliffe and Gordon (1980) place greater emphasis on a wide range of conditioned stimuli, such as those associated with euphoria seeking, pain relief, and anxiety reduction. These stimuli are present in the addict's environment, independent of withdrawal and the level of physiological dependence, and are not systematically extinguished during the course of most primary drug treatment (McAuliffe and Ch'ien 1986).

The present study took two approaches to the question of which cues are most important. The first was to ask subjects what was currently causing them to crave; and describing to them certain verbal pictures associated with different reinforcers, in order to determine how much the cues would cause them to crave during the interview. Tables 5 and 6 present the results of these efforts. The second approach employed causal modeling and is described below.

For table 5, subjects who had reported some current craving were told, "I want to know what are the things that cause you to crave (desire or need to use) opiates. I'll read the reason, and you tell me how important it is for you." The response categories were "very," "somewhat," "slightly," and "not at all important." Table 5 shows that the reasons with the highest overall ratings reflect craving caused by anxiety, depression, and euphoric effects. Least important in the addicts' judgment were both unconditioned and conditioned withdrawal sickness, socializing, and need for sexual facilitation.

However, the importance of some of these causes varied significantly from modality to modality, primarily reflecting differences in the time since the last detoxification. As a group, clients from short-term detoxification programs and methadone maintenance gave highest importance to unconditioned withdrawal sickness and euphoria seeking. By contrast, clients from long-term drug-free programs hardly mentioned withdrawal but did emphasize the negative effective

TABLE 5

Mean Importance of Reasons for Current Craving

Reasons for Craving	[illegible]								
	Short (less than 3 months)				Long (3 months or more)				
	[illegible] (n= [illegible])	[illegible] (n= [illegible])	Day (n= [illegible])	Detox (n= [illegible])	[illegible] (n= [illegible])	TC (n= [illegible])	[illegible] (n= [illegible])	[illegible] (n= [illegible])	
You are anxious and know that the drug will give you relief	2.6	2.0	2.4	1.3	2.7	1.4	2.7	1.7*	2.0
You just want to take it because it feels good	2.1	2.0	1.8	0.9	2.0	1.6	1.9	1.6*	1.7
You're feeling depressed	2.1	1.9	1.6	0.6	1.7	2.0	2.0	1.7*	1.7
You are under pressure and you want to relax	2.0	1.7	1.2	0.9	2.0	1.8	2.0	1.8*	1.6
You are having trouble handling things and you know that you would function better if you took an opiate drug	1.7	1.8	1.4	0.6	1.7	1.2	1.6	1.4	1.4
You're angry with someone or about something	1.4	1.0	1.1	0.6	1.8	1.6	1.3	0.9	1.2
You don't feel "quite right" off drugs	1.6	2.1	1.8	0.8	2.0	0.9	1.1	0.7*	1.3
You remember going through withdrawal and the memory makes you feel uncomfortable or drug sick	1.8	1.9	1.2	0.6	1.0	0.8	1.1	1.1	1.2
You feel sick from the lack of drugs (withdrawal)	1.8	2.3	2.1	0.4	0.0	0.3	0.7	0.2*	1.2
You're getting ready to socialize with friends	1.0	1.4	1.1	0.6	0.7	1.1	0.6	1.2	1.0
You want to enjoy sex or find a sex partner	0.6	0.6	0.8	0.8	1.6	0.6	0.9	0.6	0.6

* Statistically significant differences across modalities.

Note: Importance ratings: 3 = very, 2 = somewhat, 1 = slightly, 0 = not at all

TABLE 6

Craving Cues: Response to Hypothetical Situations Presented as Stimuli During Interview

Cues	PDX (n=26)	MM (n=10)	Psy (n=22)	PAIN (n=16)	CORR (n=3)	TC (n=20)	OPDF (n=7)	AFT (n=17)	TOTAL (n=121)
You are in a situation in which you often used opiates before	2.3	2.1	2.3	1.1	2.8	1.9	2.1	1.9*	2.0
You remember really enjoying how good the feeling of being under the influence of opiates was	2.3	2.1	2.3	0.8	2.6	1.7	1.7	2.1*	1.9
You open the medicine cabinet at a friend's house and there is a bottle of opiates on the shelf	1.8	2.1	2.2	0.7	2.2	2.0	2.0	1.8*	1.8
Your dentist offers to give you a prescription of opiates for a toothache	1.9	2.4	2.5	1.1	2.2	1.4	1.9	1.8*	1.8
You hurt your back and the pain is keeping you awake	1.6	2.3	2.5	1.5	2.4	1.3	1.4	1.5*	1.7
You see someone else taking a drug	2.1	1.9	2.0	0.5	2.4	1.6	1.7	2.0*	1.7
You win on the state lottery and suddenly you have some extra money to spend	2.4	1.8	1.9	0.2	2.4	1.6	1.9	1.1*	1.6
You're really bored with nothing to do	1.9	1.2	1.5	0.4	1.6	1.3	1.3	1.3*	1.3
You are going out with a close friend and really want to celebrate	1.5	1.7	1.5	0.4	0.8	0.9	0.7	0.8*	1.1

* Statistically significant differences across modalities
Ratings: 3 = a lot, 2 = some, 1 = a little, 0 = not at all

TABLE 6 (Continued)

Cues	PCK (n=26)	MM (n=10)	Psy (n=12)	PAIN (n=16)	CORR (n=3)	TC (n=30)	OPDF (n=7)	AFT (n=17)	TOTAL (n=121)
You are watching a movie or a TV show depicting the story of a person who is about to use opiates after being in a cold sweat and yawning	1.0	1.0	1.3	0.2	2.2	0.9	1.2	1.2*	1.0
There is an empty bottle of drugs on the table and you start to think that you'll soon be feeling drug sick	1.2	1.4	1.4	0.3	2.0	0.8	1.1	0.9*	1.0
You catch a cold, you're nose is running and you're feeling really bad	1.2	1.5	1.3	0.3	1.4	0.7	0.7	0.9*	0.9
Talking about drugs in an interview like this one	0.8	0.8	1.0	0.4	1.6	0.7	1.3	0.9	0.8
You read a book or magazine article about someone going through severe withdrawal	0.6	0.9	0.2	0.1	0.4	0.2	0.5	0.6*	0.4

* Statistically significant differences across modalities
Ratings: 3 = a lot, 2 = some, 1 = a little, 0 = not at all

state of being under pressure. Even though they were recently detoxified, pain patients did not rate withdrawal items as important, most likely because they typically took opiates in small regular doses and therefore key discriminitive stimuli for them were the clock and pain rather than withdrawal distress (McAuliffe et al. 1985b). The reasonableness of these findings suggests that the addicts may well have insight into the causes of their craving.

Table 6 presents the results of a slightly different question, one that attempts to elicit craving during the interview by presenting verbal stimuli (vignettes) to the respondents. All subjects, including those not currently bothered by craving, were told, "I'm going to describe situations that could happen to you. Take a minute or two to picture each situation in your mind. Then, tell me how much it makes you feel an urge for opiates, even if you would NOT give in to the urge." The situations were specifically designed to distinguish conditioned withdrawal from euphoria seeking and other motives.

The results in table 6 indicate that situations previously associated with drug use (item 1), euphoric effects (2), having ample supplies of opiates available (3 and 4), and pain (4 and 5) caused the most craving, whereas situations associated with withdrawal sickness and relief of withdrawal (items 10, 11, 12 and 14) caused the least. As in the previous set of items, pain patients responded differently from most of the other clients: they experienced urges only in response to pain--back and dental. Only subjects in corrections programs responded to the withdrawal-associated stimuli. With occasional exceptions, clients from the remaining modalities responded similarly to each other over the various stimuli. Thus, the combined results of these two sets of items suggest that stimuli associated with euphoric effects and high availability (which often translates into euphoria) and with relief of negative feeling states (anxiety and depression) were most likely to cause craving in persons graduating from drug treatment.

Causal Model of Relapse

To test these same hypotheses using statistical causal modeling, we estimated a preliminary model of the relapse process at 6 months following discharge (figure 1). The model included a composite index of anxiety and depression items from the Hopkins Symptom Checklist (DeRogatis et al. 1974); euphoria seeking (item 2 from table 6 plus the subject's response to a question on his/her willingness to take a constant, lifelong euphoria pill); a measure of current physical pain, degree of current physiological dependence (one item); responsiveness to conditioned withdrawal stimuli (items 10 and 11 from table 6); time since detoxification; amount of opiate use during the year prior to the baseline interview; number of "extinction trials" (times when drugs were available but not used since detoxification); and opiate availability at baseline. The zero-order correlations of the independent variables with relapse at 6 months are presented in table 7. They show that relapse had a number of significant predictors, pain being the weakest in this set of variables and availability at baseline having a small negative zero-order correlation with opiate use during followup.

The results of the causal modeling in figure 1 showed that the effects on relapse of most variables, except physical dependence, were felt through craving. When craving and physiological dependence were included in a regressing analysis of relapse, none of the other factors had significant direct path coefficients to relapse. Craving itself was a significant function of the amount of opiate use in the past year (which may be thought of as roughly reflecting the number of reinforced trials) and several stimuli, including anxiety and depression,

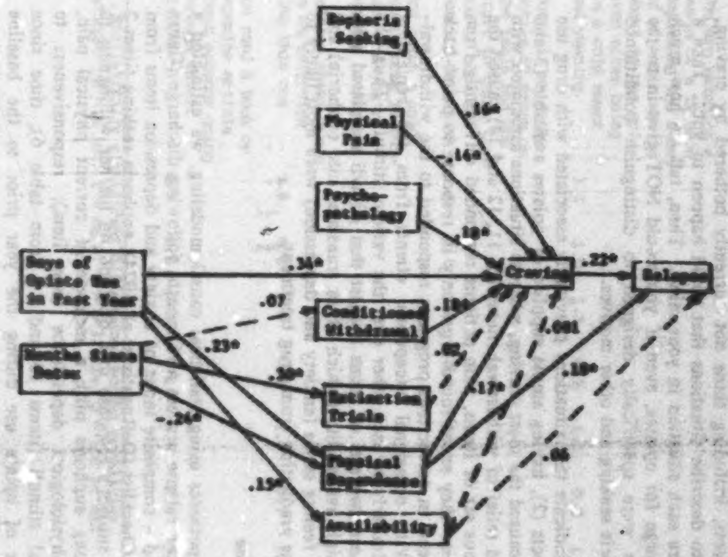
Euphoria Seeking
Physical Pain
Psycho-pathology
Days of Opiate Use in Past Year
Conditioned Withdrawal
Months Since Detox
Extinction Trials
Physical Dependence
Availability
Craving
Relapse
.16*
-.14*
.10*
.34*
.22*
.07
.18*
.23*
.02
.001
.30*
.17*
.19*
-.24*
.15*
.06

FIGURE 1

Conditioning Model of Relapse

TABLE 7

Zero-order Correlations of Independent Variables with Days of Opiate Use During the 6-Month Followup Period

Independent Variable	Correlation with Days of Opiate Use During Followup	P value
Months since detoxification at baseline	-.31	.01
Craving	.30	.01
Physical Dependence	.28	.01
Number of Extinction Trials	-.25	.01
Euphoria Seeking	.20	.01
Depression and Anxiety	.16	.02
Conditioned Withdrawal	.14	.03
Availability	-.10	.09
Pain	-.01	.47

unconditioned and conditioned withdrawal sickness, and euphoria-seeking. The sizes of these latter path coefficients were all roughly equivalent to each other. One surprising result was the lack of a significant effect of availability on craving. This effect was previously demonstrated experimentally by Meyer and Mirin (1978) and, therefore, was left in the present model despite its lack of statistical significance. Since the availability at baseline also did not affect relapse directly, in our subsequent work on these data we will have to examine this measure more closely. The most likely explanation of this result is that availability may change rapidly soon after discharge; therefore, availability just before discharge may not be a good long-term predictor of relapse. Also, the pain measure had a negative effect on craving, a result which will require closer investigation. The most likely explanation is that pain clinic patients had the highest scores on the pain measure, but only moderate scores on craving. Overall, however, the fit of the data to theoretical expectations is good.

DISCUSSION

We must emphasize first of all that these are preliminary results from a study still in the field collecting and processing data. As the project proceeds, the results will almost certainly change to some degree, although the conclusions should remain basically the same.

The results of our field effort are encouraging. The research team has recruited subjects in similar situations from a wide range of modalities, despite the fact that treatment graduates for modalities, such as methadone maintenance, are a comparatively rare species. Interviewers have succeeded in obtaining 6-month followup interviews with 94 percent of the sample. Almost as many 12-month followup interviews have been completed. Moreover, a validity check of key variables indicates that the data are clean.

Several substantive findings stand out. As expected, the modalities varied widely in outcomes during the first 6 months. We were also able to predict these outcomes rather well with a sampling design based on the time since detoxification and the kinds of clients who were admitted. The findings also confirm the theoretical importance of craving at discharge as a factor in understanding relapse, even after the type of drug treatment program a subject graduated from is controlled. Except for physical dependence, other major hypothesized causes of relapse appeared to affect relapse primarily through their ability to cause craving. The most important factors in this regard were the amount of recent drug use, physiological dependence, anxiety and depression, conditioned withdrawal sickness, and euphoria seeking. Again, we must emphasize the preliminary nature of these analyses.

Although a part of the evidence suggested that some of these factors may be slightly more important than others, the safest conclusion at this point in the study is that the evidence as a whole favors an important role for each. The differences in importance of withdrawal from one analysis to the next probably reflect differences in what is being addressed in each analysis. The data in table 6 and figure 1 reflect the ability of stimuli to elicit craving when those stimuli do occur in the vignette. However, since powerful stimuli may actually occur infrequently during followup, they may play a relatively insignificant role in predicting relapse during followup (table 7). In a previous study, McAuliffe (1982) found that conditioned withdrawal symptoms occurred in many subjects, but only in a few of those cases did those symptoms cause relapse.

Clinical Implications

Research on relapse should have important clinical implications. Clients in treatment and aftercare programs should be educated regarding the course of their disease and the prospects for recovery when certain events, such as a "slip" or "lapse" occur. Recovering addicts benefit from knowing what the major causes of craving and relapse are and how they can be avoided (McAuliffe and Ch'ien 1986). Studies of addict careers--as well as studies of the causes of relapse--can, therefore, be quite useful in treatment if the findings are communicated effectively to drug counselors and their clients, and systematically incorporated into relapse prevention programs (e.g., Zackon et al. 1985; Marlatt and Gordon 1979).

Evidence in the present study on relapse rates and craving across modality suggests a change in clinical emphasis. Completers of long-term drug-free programs and aftercare report less craving and were less likely to relapse. Highly motivated clients from short-term programs and methadone maintenance should be channeled into these drug-free modalities in order to reduce craving, with the promise that satisfactory completion of the program offers the best chance of recovery.

Finally, the discussion of the meaning and measurement of relapse has implications for treatment policy. The present research and the author's previous work (McAuliffe et al. 1985a) indicates that a single episode of opiate use does not necessarily imply a high degree of relapse long-term. studies which define relapse as any use of the drug of abuse produce the highest possible relapse rates, and thereby can create an atmosphere of therapeutic pessimism for clinicians and policymakers. Research presented in this volume clearly demonstrates that addiction is a chronic disease. A chronic disease model of addiction would take amelioration rather than absolute cure as a realistic treatment goal; the measurement of relapse should ideally be consistent with this goal.

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ACKNOWLEDGMENT

National Institute on Drug Abuse Grant Number DA-02798 supported this research.

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Relapse to Use of Heroin, Cocaine, and Other Drugs in the First Year After Treatment

Robert L. Hubbard and Mary Ellen Marsden

INTRODUCTION

Previous research documents that the major drug abuse treatment modalities substantially reduce drug use during and after treatment from pretreatment levels (Craddock et al. 1985; Hubbard et al. 1984; Tims 1981; Simpson et al. 1978; Simpson and Lloyd 1978). Many clients, however, relapse to drug use after treatment. Little is known about the process and timing of relapse, particularly when multiple drugs are used before and after treatment. Better understanding of the nature and causes of relapse should contribute to the design of more effective treatment and aftercare approaches. Modified treatment approaches could reduce relapse rates for particular types of drugs, extend the time until relapse, and lessen the severity of posttreatment drug use. This brief paper describes the complex nature of relapse and examines the timing of relapse to use of specific drugs and the change from pretreatment periods in overall drug use patterns for a sample of 2,280 drug abuse treatment clients participating in the Treatment Outcome Prospective Study (TOPS).

MULTIDIMENSIONAL NATURE OF RELAPSE

Abuse or dependence is usually characterized in terms of the use of a single substance such as heroin, alcohol, or tobacco. The understanding of relapse to drug abuse, however, is complicated by current drug abuse patterns that involve multiple use of a wide range of types of licit and illicit drugs (Craddock et al. 1985) and many patterns of abuse. A common pattern is the weekly or more frequent use of marijuana, cocaine, alcohol, and heroin (Hubbard et al. 1985). Heroin abusers commonly substitute other drugs for heroin. Descriptions of drug abuse and relapse that consider only single drugs are inadequate. Definitions of relapse must take into account the patterns of use of multiple drugs and alcohol. A multidimensional definition of relapse should also include consideration of the type, extent, and timing of relapse.

A basic *type* of relapse is the posttreatment return to use of a specific drug (e.g., cocaine) that was used before treatment. A second type of relapse is the nonmedical use of a drug to substitute for a principal pretreatment drug (e.g., other narcotics as a substitute for heroin). A more comprehensive definition of relapse is the posttreatment resumption of the pretreatment pattern of drug use (e.g., multiple use of heroin, cocaine, marijuana, and alcohol) or the development of new patterns of use. Relapse, then, may be use after treatment of a specific pretreatment drug, nonmedical use of its substitute, or it may refer to an overall use pattern.

The likelihood of relapse after a particular mode of treatment can be measured in various ways. The four methods of measurement below consider two key dimensions: frequency of use and pretreatment drug use patterns.

Any Posttreatment Use Among All Clients	-	Percentage of all clients reporting any use in the year after treatment.
Any Posttreatment Use Among Pretreatment Weekly Users	-	Percentage of clients who used weekly or more frequently before treatment and reported any use in the year after treatment.
Any Posttreatment Use Among Pretreatment Monthly Users or Nonusers	-	Percentage of clients who used in the year after treatment among clients who did not not use weekly in the year before treatment.
Posttreatment Users Who Report Daily Use	-	Percentage of clients who reported using their posttreatment primary drug daily for at least 30 days in the year after treatment among all clients who used that drug in the year after treatment.

Each measure is useful but only partially describes relapse. The first definition does not consider posttreatment or pretreatment use levels. The second and third definitions consider pretreatment use levels but not posttreatment use levels. The fourth definition focuses on the most severe relapse. A complete exploration of posttreatment use should include relapse to weekly use as well as relapse to the pretreatment frequency. Relapse measures should be developed that consider resumption of any use as well as use that is less severe or frequent than pretreatment patterns of use.

Within each of these types of relapse, indicators of the extent of relapse, such as frequency and severity, add an important dimension to the description of drug use patterns and use of specific drugs. The timing dimension considers the latency, duration, and episodic nature of relapse (Mann et al. 1984). Drug abuse treatment clients may continue drug use throughout treatment or may cease use during treatment, only to resume use before leaving treatment or at various times after treatment. The first posttreatment use may be brief and have little clinical significance, or use may continue for weeks, months, or years. The lengths of periods of use and abstinence after treatment are variable and the periods are cyclical (see Maddux and Desmond 1974).

To appropriately study relapse, the pretreatment pattern of drug use and the overall posttreatment pattern should be considered. Posttreatment marijuana use by a client who used heroin daily before treatment and by another who used only marijuana are not equivalent. Shifts to less serious drug use patterns can be viewed as indicators of improvement rather than relapse.

A brief episode of infrequent use may not indicate serious relapse. On the other hand, brief episodes of heavy use, even those separated by long intervals of abstention, may be predictive of serious relapse in the future. Relapse needs to be defined by level and severity and within the context of overall use patterns. Indices of multiple drug use patterns have been developed and used in major national studies (Bray et al. 1982; Savage and Simpson 1976).

METHODS

The Treatment Outcome Prospective Study (TOPS) used personal interviews to obtain detailed drug use histories of 11,750 clients entering 41 detoxification, outpatient methadone, residential, and outpatient drug-free (OPDF) treatment programs in 10 cities from 1979 to 1981 (Hubbard et al. 1984). Three different samples totaling 5,000 of these clients were reinterviewed at 3 months, 12 months, 2 years, and 4 years after treatment.

Most of the analyses reported in this paper are based on the pretreatment and posttreatment drug-use patterns of 2,280 clients from the 1979 and 1980 admission cohorts who were interviewed at intake and approximately 1 year after they left treatment in one of the four modalities.

The drug-use measures developed for this paper are based on the comprehensive assessments of nonmedical use of 12 different drug types. These assessments were obtained in interviews covering the year before admission and the first year after termination. Quantity and frequency of alcohol use and frequency of use of all types of drugs for nonmedical purposes during the 12-month periods before and after treatment were obtained. Clients were asked to report their frequency of use on a 9-point scale from nonuse to use four or more times per day. At the followup, clients were asked how much time elapsed before use of specific drugs was resumed after leaving treatment. For heroin and for the clients' primary drug of abuse at the time of followup, questions were asked about the time until daily use was resumed.

NATURE AND EXTENT OF RELAPSE FOR FOUR SPECIFIC DRUGS

Drug use in the first year after treatment was common. About one in five reported weekly or more frequent heroin use, and about one in four reported weekly or more frequent use of other nonnarcotics (amphetamines, sedatives, barbiturates, minor tranquilizers) (Hubbard et al. 1986.) While such simple frequency data on posttreatment use are informative, relapse can be described more appropriately in the context of pretreatment use. Marijuana use, while of interest, was not considered in the present analysis, and is excluded from the "other nonnarcotics" category.

Types of Relapse

The magnitude of the relapse rates for each of the four types of drugs shown in table 1 differs by drug and definition of relapse. The relapse rates among pretreatment weekly users were similar for all drugs. Posttreatment use rates for cocaine and other nonnarcotics for pretreatment nonusers and those who used monthly or less frequently before treatment were twice the rates for heroin and other narcotics. This posttreatment use by pretreatment nonusers or low-level users may mean that cocaine and other nonnarcotics were being used in lieu of heroin and/or other narcotics used before treatment. The probability of relapse to daily use of a primary drug among all posttreatment users was highest for heroin (54 percent). Twenty-five percent or fewer users of other narcotics, cocaine, and other nonnarcotics relapsed to daily use of these drugs.

TABLE 1

Types of Relapse Rates in the Year After Treatment for Four Drug Types

Types of Relapse	Drug Used Posttreatment			
	Heroin	Other Narcotics	Cocaine	Other Nonnarcotics
	%	%	%	%
Any Posttreatment Use Among All Clients	31.9	28.3	44.0	45.3
Any Posttreatment Use Among Pretreatment Weekly Users	58.6	57.0	65.0	60.2
Any Posttreatment Use Among Pretreatment Monthly Users or Nonusers	16.8	19.7	36.2	35.3
Posttreatment Daily Use Among Posttreatment Users	53.6	25.1	20.1	16.7

Time Until Relapse

Former clients were asked when they first used each drug after treatment. Clients also identified their primary problem drug and reported when they first used that drug daily for at least 1 week.

In table 2, the distributions of the periods between termination from treatment and first use of four types of drugs are presented for all former clients who reported any use in the first year after treatment. About 15 percent of clients who used drugs other than marijuana in the year after treatment were using the drug at treatment termination, and another 25 percent resumed use within the first week after discharge. A month after leaving treatment, about 60 percent of those who would relapse in the year after treatment had resumed use. About half the remaining 40 percent relapsed 1 to 3 months after termination. The timing of relapse appears to be similar for the four types of drugs. The length of time until relapse may be critical for long-term rehabilitation outcomes.

TABLE 2

Time Until First Use in the First Year After Treatment Among Clients Who Reported Posttreatment Use of Each of Four Drug Types

Weeks After Termination	Drug Used Posttreatment			
	Heroin	Other Narcotics	Cocaine	Other Nonnarcotics
	%	%	%	%
Used at termination	15.3	14.4	10.7	15.2
Within 1 week	28.9	22.8	21.6	24.3
2-4 weeks	21.4	24.1	24.6	24.5
5-13 weeks	15.8	13.9	17.6	16.0
14 or more weeks	18.6	24.8	25.5	20.0
Total	100.0	100.0	100.0	100.0
Number of Posttreatment Users	720	626	984	1,026
Mean Days to Relapse Among Those Who Used Posttreatment	55.0	68.3	71.9	58.8

Table 3 shows the time until first relapse to daily use for the four types of drugs. One-third of posttreatment daily heroin, cocaine, and other nonnarcotics users and half of the other narcotics users who were to become daily users in the year after treatment were using daily at treatment termination. On the other extreme, about one in five had been out of treatment at least 3 months before beginning daily use. Extending the period between treatment termination and daily use would seem to be important to establishing long-lasting abstinence. The variations in the timing of the relapse to daily use for narcotics other than heroin compared to the other three types of drugs suggest that the course of relapse to daily use may differ by drug.

The timing of relapse to daily use appears to be different from the timing of relapse to first use. Those who were to become daily users were most likely to relapse immediately following termination. First daily use for those who did not immediately start using heroin daily after treatment was more evenly spread over the 3-month time span than was first use of the same drug.

TABLE 3

Time Until Daily Use in the Year After Treatment Among Clients Who Reported Posttreatment Use of Each of Four Drugs Types

Weeks After Termination	Drug Used Daily Posttreatment			
	Heroin	Other Narcotics	Cocaine	Other Nonnarcotics
	%	%	%	%
Used at termination	32.1	49.0	34.9	37.4
Within 1 week	13.5	9.6	7.1	11.7
2-4 weeks	20.7	15.9	19.1	16.4
5-13 weeks	15.5	14.0	19.8	15.8
14 or more weeks	18.1	11.5	19.1	18.7
Total	100.0	100.0	100.0	100.0
Number of Post-treatment Daily Users	386	157	126	171

CHANGE IN PATTERNS BETWEEN PRETREATMENT AND POST-TREATMENT YEARS

Describing posttreatment use of a specific type of drug does not provide a complete picture of relapse. Here the concept of relapse to drug use is broadened to consider differences between pretreatment patterns and posttreatment patterns.

Multiple drug use by TOPS respondents before treatment was common. Comparisons of the use patterns of clients in the TOPS and Drug Abuse Reporting Program (DARP) research provides evidence of the increasing prevalence of multiple drug use over the past decade (Hubbard et al. 1985). The focus on daily use of heroin and other narcotics alone in many studies of treatment clients in the 1970s (Savage and Simpson 1977) may no longer be fully descriptive of the extent of drug use or be appropriate indicators of relapse.

Several approaches were used in TOPS analyses (Bray et al. 1982; Hubbard et al. 1985) to examine patterns of multiple drug use including a set of drug use patterns adapted from the DARP classification scheme (Simpson 1974). The extensive variety of combinations of weekly use of eight drug types used by TOPS clients suggested that broad rather than specific categories were required to describe clinically useful patterns.

Patterns were defined by hierarchical rules that required weekly or greater use of key drugs or drug types. First, two types of heroin users were defined: heroin users who used other narcotics and heroin users who did not use other narcotics. Next, among the remaining clients, users of narcotics other than heroin and users of nonnarcotics (excluding marijuana and alcohol) were then identified. Finally, alcohol/marijuana users and minimal users (clients who did not report weekly use of any drug or alcohol) were the residual group. The resulting five categories are hierarchical; clients were included in the less serious patterns only if they did not meet the criteria for the more serious patterns. The defining characteristics of the patterns do not identify all drugs used by the clients. Rather, they indicate the key drugs and their use levels. In table 4, the five hierarchical patterns are shown. The alcohol and marijuana patterns were included with nonweekly users of any drug. This analysis does not consider any level of use of alcohol, marijuana, or infrequent drug use as relapse.

From table 4 it is clear that the patterns shift between pretreatment and posttreatment periods, particularly to the cells to the right of the diagonal, indicating a movement to less serious use patterns after treatment. More than 40 percent of each of the three types of narcotic users move to the alcohol/marijuana/minimal pattern. However, 20 percent of heroin-other-narcotic users, 39 percent of heroin users, and 24 percent of other narcotic users resume their pretreatment use pattern. Between 10 percent and 20 percent of the users of heroin and/or narcotics reduced their use to nonnarcotics in the year after treatment. About 16 percent of heroin-other-narcotic users eliminated heroin use but resumed other narcotics use.

Because drug abuse is a multidimensional phenomenon best described by multiple drug patterns rather than single drugs, additional analyses should be conducted to examine in more detail the transitions among drug abuse patterns from pretreatment to posttreatment periods. The patterns in table 4 provide a structure for more detailed analyses of relapse.

TABLE 4

Relapse Rates to Different Drug Use Patterns in the Year After Treatment for Clients with Five Pretreatment Use Patterns

Pretreatment Drug Use Pattern	Posttreatment Drug Use Pattern				
	Heroin-Other Narcotics	Heroin	Other Narcotics	Non-narcotics	Non-relapsers*
	%	%	%	%	%
Heroin-Other Narcotics (n = 225)	20.4	7.6	16.4	12.7	44.9
Heroin (n = 643)	5.1	38.7	2.8	10.6	42.8
Other Narcotics (n = 295)	8.1	2.0	24.4	18.3	47.1
Nonnarcotics (n = 508)	2.4	4.7	6.1	27.8	59.0
Alcohol/Marijuana Minimal (n = 609)	2.8	3.8	4.9	12.8	75.7

*Includes all clients not classified as relapsing during the year of posttreatment. Some of these may have had alcohol, marijuana, or infrequent other drug use.

SUMMARY AND RECOMMENDATIONS

This paper briefly assessed the multidimensional nature of relapse to drug use, the length of posttreatment abstinence periods for four types of drugs, and resumption of drug use patterns.

Rates of relapse defined in various ways showed important differences among the drugs. Relapse to daily heroin use, for example, was very high compared to the relapse to use of the other three types of drugs. The timing of relapses was quite similar for all 4 drugs. Approximately two-thirds of clients who relapsed did so within the first 3 months after leaving treatment. Between 10 percent and 15 percent were using at treatment termination. More emphasis on aftercare and postdischarge counseling that focuses on prevention of relapse might help reduce relapse rates and increase periods of remission for relapsing clients.

Consideration of the complementary concept of reduction in overall use patterns (in addition to reduction in use of individual drugs) could help researchers and clinicians better understand posttreatment use. Because of the complexity of drug abuse, different conceptualizations of relapse and reduction in drug use need to be examined. The drug abuse pattern measure used here is one way to describe the shift among patterns.

The preliminary analyses presented in this paper indicate the complex nature of relapse among former drug abuse treatment program clients. Survival analysis or failure rate analysis could also be used to examine the timing of relapse in more detail. In order to learn how treatment can minimize the risk of relapse and lengthen abstention periods, studies are needed to:

- describe the multidimensional nature of relapse (type, extent, timing, and the overall drug use pattern) and the relapse to use of specific drugs within the context of multiple drug use patterns;
- identify the correlates of relapse, particularly behavior, during treatment and in the first 3 months after leaving treatment; and
- assess the effects of relapse prevention efforts such as discharge evaluations and aftercare services in the first months following termination.

Relapse is a complex, dynamic process that must be examined more carefully by researchers and clinicians. The extensive treatment histories of many clients entering and re-entering programs suggest that recovery from drug use is long term, and episodic relapses are experienced. The process of recovery occurs throughout the drug use and treatment career. A better understanding of this process should lead to improved treatment and aftercare services that will reduce verall relapse rates, extend remission periods, and reduce the duration of relapse episodes.

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Smoking Cessation and Relapse Among Cardiac Patients

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Most clinical research concerning smoking cessation has been conducted with participants in organized smoking cessation treatment programs. Such individuals, and their experiences with smoking cessation, may not be representative of the larger population of smokers. Participants in organized cessation programs certainly represent a self-selected subsample of smokers, and little is known about the dimensions in which this self-selected group might differ from other smokers. However, since the vast majority of smoking cessation occurs outside of such structured treatment contexts, we can see that, at least in a statistical sense, these treatment participants are an "unusual" subsample. Perhaps further useful information concerning smoking cessation and relapse might be gained by studying these processes in situations in which they spontaneously occur, rather than in organized treatment settings.

Among the populations most likely to spontaneously discontinue their smoking habits are individuals who have recently experienced an adverse cardiac health event. In particular, it is estimated that approximately one-third to one-half of smokers who suffer a myocardial infarction (MI) either discontinue or dramatically reduce their smoking habit immediately following the event (Burlington et al. 1984). In this chapter, we will summarize recent work we have been conducting, examining cigarette smoking cessation, and relapse among myocardial infarction patients.

POPULATION

Participants in these studies were hospitalized surviving myocardial infarction patients who reported being cigarette smokers at the time of their heart attack.

SETTING

This work was undertaken because the naturally occurring epidemiology of smoking in this population--with smokers rapidly dichotomizing themselves into long-term quitters versus resumers of smoking--appeared to offer a convenient context within which to examine factors associated with these differential smoking outcomes. Other features of the cardiac care setting also made it attractive as a context for studies of smoking behavior. The fact that surviving myocardial infarction patients routinely received several days of intensive care in the Coronary Care Unit where smoking was not possible, meant that all patients

would be beginning their ambulatory recovery period in a tobacco-abstinent status. The fact that patients routinely remained in the hospital for several days of ambulatory recovery following intensive care made it convenient to collect data from patients and made it possible to assess their smoking during this ambulatory period when smoking relapse became possible. In addition, medical charts provided valuable supplemental sources of data, and routine medical aftercare provided a convenient opportunity for assessing smoking status outcomes post-hospitalization.

IN-HOSPITAL RELAPSE

When we first proposed to study smoking relapse in myocardial infarction patients, the hospital's cardiologists indicated that this was not practical since these patients were not permitted to smoke. However, in our initial study we found that these medical rules did not reliably control patient behavior.

In this first study (Baile et al. 1982) we conducted single predischarge interviews with 66 patients concerning their smoking. These interviews covered smoking history, health beliefs, and craving and smoking experiences during hospitalization; these results were considered in relation to one another, in relation to demographics, and in relation to medical chart information concerning the severity of disease.

The most dramatic finding was the rapidity and prevalence of in-hospital smoking relapse among these myocardial infarction patients. Patients had been on the ambulatory recovery unit on average for less than 5 days, but during this time fully 38 percent of the patients had resumed smoking. Among relapsers, the mean latency to smoke following transfer from intensive care was 2.25 days. Smoking relapse did not typically occur in full-blown intensity during hospitalization; patients reported smoking an average of 5.14 cigarettes per day when they smoked. Despite the relatively moderate level of this smoking, it was considered a likely precursor of more intensive smoking upon hospital discharge.

Examination of the data to identify factors associated with, or predictive of, smoking relapse revealed that the only significant relationships were with indicators of myocardial infarction severity. Peak blood levels of the enzyme creatine kinase (CK) were used as the primary objective biological index of infarction severity. CK is released when tissue is damaged, and peak CK levels can be used both diagnostically and prognostically in evaluating myocardial infarctions. Higher CK levels are generally reflective of greater tissue damage. Patients who relapsed to smoking during their hospitalization had average peak CK levels that were significantly lower than those of patients who abstained from smoking throughout their hospitalization. Thus, smoking abstinence appeared most likely among patients who had suffered more severe infarctions, and smoking relapse appeared most likely among patients with the least cardiac damage.

The likelihood of smoking relapse bore a graded negative relationship to the peak CK level, as illustrated in figure 1. This graded relationship was statistically significant, with $p < 0.005$, according to Bartholomew's chi-square test for ordered samples.

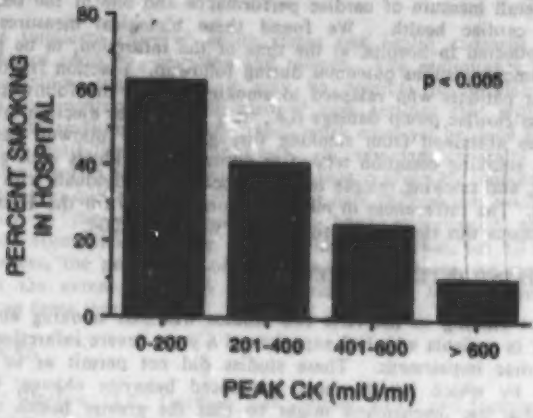

FIGURE 1

From Burling et al. 1984. Copyright 1984, Lawrence Erlbaum Associates, Inc.

There were no significant differences between patients relapsing and abstaining during their hospitalization on demographic characteristics, smoking histories, health beliefs, or reported craving for cigarettes. Thus, severity of smoking-related adverse health effects was a more powerful predictor of early smoking abstinence versus relapse than were these psychosocial variables.

POST-HOSPITALIZATION SMOKING OUTCOMES

A major limitation of the previous study was that it examined smoking only during the brief period of hospitalization immediately following myocardial infarction. In a subsequent second study we followed patients' post-hospitalization to assess long-term smoking outcomes, and we used expired breath carbon monoxide assessment to provide an objective biological index of smoking status (Bigelow et al. 1984). Patients were contacted approximately 5 times per week during their hospitalization, and were followed post-hospitalization for an average of 12 months.

During the in-hospital period, some of the relationships observed in the previous study were replicated. Again, a high rate of in-hospital smoking relapse was observed--36 percent. Also, again, peak CK level was significantly lower in those patients who resumed smoking during hospitalization.

In examining long-term smoking outcomes, peak CK was no longer a significant predictor. However, another index of MI severity did indicate the same relationship of smoking outcome to severity as was noted during the in-hospital phase. Assessment of left ventricular ejection fraction by radionuclide ventriculography was introduced into the cardiology service as a new diagnostic and prognostic procedure part way through our study, so these data were available only for 68 patients. Ejection fraction is a dynamic measure of cardiac pump performance, providing a measure of the proportion of left ventricular blood volume that is ejected when the heart contracts; it is generally accepted as the best overall measure of cardiac performance and one of the best prognostic indices of cardiac health. We found these biological measures of cardiac function, collected in-hospital at the time of the infarction, to be predictive of long-term smoking status outcomes during followup. Ejection fraction measures showed that patients who relapsed to smoking during the followup period had suffered less cardiac pump damage (i.e., they had higher ejection fractions) than patients who abstained from smoking throughout the followup period. Thus, once again, smoking cessation tended to occur in individuals with greater health impairment, and smoking relapse tended to occur in individuals with lesser health impairment. The differences in mean ejection fractions for the abstaining versus relapsing groups was statistically significant, with $p < 0.004$.

ANTI-SMOKING INTERVENTION

A consistent finding in the first two studies was that smoking abstinence was more likely in patients who had experienced a more severe infarction or suffered greater cardiac impairment. These studies did not permit us to identify the mechanism by which health status influenced behavior change; however, we suspected that the mechanisms might be that the greater health threat served more effectively to motivate behavior change.

In a subsequent study, we sought to increase the prevalence of post-MI smoking abstinence by taking advantage of the motivational potential of the inpatient cardiac treatment setting to encourage smoking cessation (Rand et al. 1985). One hundred inpatients were randomized to receive either usual cardiology care and education or to receive usual care plus a supplemental directive anti-smoking message from a member of the research team. All patients received daily interviewing about their smoking behavior, experience, and plans, as well as daily breath carbon monoxide sampling to assess their smoking status.

As it turns outs, our randomization was irrelevant to outcome; rather it appears that the attention we brought to bear on smoking for all subjects had an across-the-board effect of reducing in-hospital smoking relapse. The evidence for this effect comes from examining the rates of in-hospital smoking relapse during this study in comparison to the periods immediately preceding and immediately following it. Prior to the start of this study, the incidence of in-hospital smoking relapse was 39 percent. During this study, the incidence of in-hospital smoking relapse fell, in successive time periods, first to 18 percent and then to 9 percent. Upon termination of this study and the contacts with patients and staff concerning smoking, the incidence of in-hospital smoking relapse rose once again--to 22 percent. Analysis of this final study is still underway, and its results can only be considered preliminary. However, it appears that a procedure of intensive data-gathering concerning smoking--a procedure that was intended to be only neutral data-gathering and not an intervention--actually functioned as an effective anti-smoking intervention and reduced the incidence of in-hospital smoking relapse among post-MI cardiac patients. These data, though preliminary, are encouraging of the possibility of developing and implementing intervention programs for delivery in medical care settings that might effectively reduce the prevalence of smoking inpatient populations.

DISCUSSION

These data implicate patients' health status and health concerns as important determinants of smoking cessation and relapse. The preliminary results of our intervention study suggest that it may be possible to develop intervention procedures for incorporation into medical care settings that will significantly reduce patients' smoking. However, much work must yet be done to demonstrate the practical feasibility of this approach. Survey data generally indicate that concerns about health are the most common reason given by smokers for quitting or for wanting to quit smoking. The present data suggest that smoking cessation is enhanced to the degree that patients have experienced adverse health consequences from their smoking. We would suggest that, for all the substance abuse disorders, the probability of discontinuing substance use may depend, in part, upon the extent to which the individual user has experienced adverse consequences from that use.

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Clinical Implications of Relapse Research

Bruce J. Rounsaville

Relapse and relapse prevention define the major clinical problems to be faced by clinicians and researchers who work with substance abusers. Unlike other mental disorders, substance abuse disorders have a necessary, if not sufficient, cause--the abused drugs themselves. For all classes of abused substances, procedures are highly developed for temporarily separating substance abusers from their abused substances and keeping withdrawal symptoms at safe and comparatively comfortable levels (Lowinsohn and Ruiz 1981). It is not necessary for any detoxification procedures to last longer than 1 month and some can be accomplished in less than 1 week (Riordan and Kleber 1980). Hence, if relapse were not a major issue, substance abuse treatment could be limited to a small subspecialty of medicine that concentrates on detoxification handled in medical wards, emergency rooms, and outpatient medical clinics.

However, relapse (defined as resumption of substance abuse following a period of abstinence) is the rule and not the exception in substance abusers entering or completing treatment. Presentations in this volume and a large literature suggest that a majority of those leaving a treatment program will relapse at least once with greatest vulnerability to relapse in the first three months following treatment (Hall, Hubbard, Maddux and Desmond, Simpson and Marsh, this volume). Although successful efforts to curtail substance abuse may be more frequent in untreated populations, as shown by the Viet Nam experience and other reports (Robins 1980; Robins et al. 1974), clinicians are most concerned with the comparatively poorer prognosis group who seek treatment.

In this chapter, the author will discuss material presented in previous chapters as it relates to four issues: 1. commonalities and differences in relapse to different substances of abuse; 2. promising directions for discriminating among groups of patients to allow for better patient/program matching; 3. the need for more research on the efficacy of different treatment strategies for relapse prevention; and 4. relapse prevention strategies which are practicable within the kinds of substance abuse treatment programs currently in place. The current state of knowledge on factors related to relapse and its prevention raises more questions than it answers. Hence, this chapter will be more heavily focused on possible directions for future research than on immediate treatment implications.

COMMONALITIES AND DIFFERENCES ACROSS DIFFERENT CLASSES OF DRUGS

A theme across most chapters in this volume is the shared features of different types of substance abuse. Regarding relapse, the most important shared feature is the rate and speed of relapse to different substances. This is best illustrated by the widely cited and reproduced graph by Hunt, Barnett and Branch (1971), of relapse rates over 12 months following treatment, showing that smokers, alcoholics, and heroin addicts are alike in having relapse rates of greater than 60 percent in the first year posttreatment and relapse rates of greater than 50 percent in the first three months. Most theories of drug abuse, including those reviewed by Drs. Babor, Wesson and Grabowski (this volume), assume commonalities in addiction and relapse to different substances, especially those for which tolerance and withdrawal are prominent features. In addition, the data presented by Dr. Hubbard from multiple substance abuse treatment programs suggest that abuse of multiple drugs is the norm in those seeking treatment, and relapse may take the form of resumption of abuse of the same substance or of another substance, a finding which is consistent with much previous literature (Green and Jaffe 1977; Simpson et al. 1979). Hence, in practice, substance abusers appear to act as if there are important similarities in addiction and relapse to different drugs.

Despite these widely recognized similarities across abused drugs, clinicians and even self-help groups persist in physically and conceptually segregating the treatment of those who abuse different classes of drugs. Thus, even if cross drug similarities are important and recognized, many clinicians appear to believe that dissimilarities across drugs are of sufficient importance to warrant the development of independent treatment approaches. To translate theories of relapse and research findings into improved treatment strategies, several important cross-drug differences may need to be considered.

First, there are vast differences across drugs in the legality, social desirability, availability, financial cost, medical consequences, and interaction of pharmacological properties with ability to carry out productive work and family life. Thus, for example, while smoking cigarettes and self-injecting heroin may share underlying reinforcement principals and the propensity for relapse following treatment, the "psychosocial" differences in the two addictions profoundly affect the populations at risk and the circumstances leading to treatment seeking. Cigarettes are comparatively inexpensive, legally obtained, do not cause impairment in mental functioning during an intoxicated state, and seldom lead to adverse social and occupational consequences, although the medical consequences are profound. Conversely, heroin is illegal, expensive, characterized in its effects by major fluctuations in mental state and mood related to intoxication and withdrawal effects, and likely to be associated with major legal, social, occupational, and medical consequences. Hence, cigarette smokers seeking treatment come from all socioeconomic strata and are motivated to curtail use by the desire to prevent or reduce physical consequences of their habit. In contrast, heroin users are more frequently from disadvantaged segments of the population, involved in illegal activities to support and obtain drugs, and motivated to seek treatment because of serious social, occupational, or legal pressure. These kinds of differences reduce the extent to which abusers of different substances recognize a commonality with abusers of other substances. Likewise, the treatment interventions aimed at maintaining abstinence and preventing relapse for the different classes of drugs are likely to be greatly affected by the differences in the populations involved. For example, the occupational and legal counseling needed by many treatment-seeking heroin addicts is clearly irrelevant to the vast majority of those who need help with stopping cigarette smoking. As another example, while a general cross-drug principle in relapse prevention may be avoiding the situations in which use of drugs is likely, these will be vastly different for heroin addicts, alcoholics, and cigarette smokers.

The types of pharmacological strategies available for maintaining abstinence are also greatly different across abused drugs. These include (a) maintenance on a drug with similar agonist effects but pharmacological properties that reduce the dysfunctional aspects of substance use, such as methadone maintenance or use of nicotine chewing gum, (b) use of antagonists which reduce the positive reinforcing properties of the substance if it is used after a period of abstinence, and (c) use of substances, such as disulfiram, which lead to profound negative reinforcement if the abused substance is used after a period of abstinence. While the latter two types of pharmacological aids to maintaining abstinence have appealed to only a relatively small minority of abusers of the relevant classes of drugs (Green and Jaffe 1977), the maintenance approach has been the dominant one for treatment of opioid addiction (Kosten and Kleber 1984). For no other class of drugs has maintenance been a major treatment strategy, and this difference results in major cross-drug dissimilarities in (a) the way that relapse is defined, (b) the goals of treatment, and (c) the major parameters of treatment such as its length, counseling strategies, etc. Thus, the definition of relapse is fairly straightforward for drugs such as cocaine or cigarettes for which abstinence appears to be the only acceptable outcome. In contrast, for opioid addicts, continuation of powerful opioid use in the form of methadone is not considered relapse as long as the client refrains from using illicit opioids. Hence, the comparability of findings regarding predictors of relapse, efficacy of treatment strategies, etc., is greatly limited when opioid addicts are considered. To make cross-drug findings comparable, only those who are not maintained on methadone can be utilized. To illustrate why this is necessary, one can consider the issue of the impact of degree of dependence (Babor et al., this volume; Edwards et al., in press) on relapse to different classes of drugs following a period of abstinence while in treatment. While it may be predicted that those with greater prior dependence might take a shorter time to relapse, this prediction may not hold in a mixed group of heroin addicts who had entered methadone maintenance or a drug-free program. For methadone maintenance, those who were more severely dependent may be those most likely to stay in treatment and thus to avoid relapse, while the converse would be most likely for a drug-free program. Likewise, the option of drug maintenance as an approach to treatment has profound effects on the goal of treatment and its desirable duration. For opiate addicts, the ultimate goal of treatment may be abstinence from all opiates. However, an intermediate goal for several years would be maintenance on methadone while improving psychosocial functioning. For many addicts, the goal of successfully curtailing methadone maintenance at any time is believed to be unrealistic (Dole and Nyswander 1967). Alternatively, the goal of treatment for other classes of drugs is either abstinence or, more controversially, controlled use (Orford et al. 1976; Sobell and Sobell 1978). These fundamental differences in goals of treatment necessitate great differences in the way that abusers of different classes of drugs are encouraged to think about resolving their drug use problem.

To sum up, while many underlying similarities can be noted across theories and patterns of relapse to different classes of drugs, translating basic knowledge into effective treatment strategies may need to be done separately for different classes of drugs. In some instances, the patterns of use are so similar across drugs that a successful strategy for curtailing, for example alcoholism, can be readily translated to cocaine abuse with minor modifications. However, whenever the goal of treatment is not abstinence, relapse prevention strategies need to differ greatly and comparison of followup research findings across drugs cannot be made directly.

SOME ISSUES FOR CROSS-SUBSTANCE RESEARCH

Several of the chapters in this volume suggest the need for cross-drug research in order to determine similarities and differences as they relate to potential treatment strategies. For example, a major issue for the dependence construct presented by Dr. Babor (this volume) is the degree to which behaviors hypothesized as making up the dependence syndrome are found in drugs other than alcohol. The dependence syndrome has important implications for the goals and strategies of treatment because of its relationship to the issue of multidimensionality of functioning and of controlled substance use as a goal of treatment. According to the dependence construct, functioning of substance abusers is multidimensional, so that severity of dependence is at least somewhat independent of the social and occupational consequences of substance abuse. Hence, improvement in one area, such as achieving abstinence, will not necessarily lead to improvement in other areas. Conversely, failure to achieve abstinence will not necessarily prevent attainment of treatment goals in other areas. This emphasis goes against the strategies of medical model programs and others, such as Alcoholics Anonymous, which emphasize abstinence as the major goal which must be achieved before other issues are considered (Wesson et al., this volume). Another corollary of the dependence construct is that controlled substance use may be an acceptable goal for those whose degree of dependence is not high (Orford et al. 1976). This proposition has been highly controversial in the treatment of alcoholism. If cross-drug studies show that the characteristics of the dependence syndrome are similar across drugs and that severity of dependence is related to relapse, this would add impetus to efforts to translate successful treatment strategies developed with one substance to treatment of those who abuse other substances, and increase the utility of multidimensional outcomes and controlled use in treatment planning.

In developing innovative treatment strategies for preventing relapse to different substances it would be desirable to have a paradigmatic substance, clients who are comparatively amenable to participating in the research, a definition of relapse which is clear and where treatment failure can be noted after a comparatively brief interval. The several chapters in this volume pertaining to cigarette smoking (Bigelow et al.; Brandon et al.; Hall and Havassy; Grabowski) suggest that this type of substance dependence has these properties which may make it a fruitful area in which to explore the determinants of relapse and to test rapidly different approaches for preventing relapse. Because cigarettes are legal and inexpensive enough to not be associated with financial strain to support the habit, subjects are likely to be more cooperative and truthful about their cigarette use. In defining relapse, there appears to be a powerful relationship between smoking a single cigarette and resumption of compulsive use. Also, abstinence is the usual treatment goal. Hence, relapse can be precisely measured. In addition, the great majority of relapses appear to occur comparatively quickly following completion of treatment, which is also comparatively brief. Hence, the amount of time needed to complete paradigmatic studies is comparatively brief. Because of these considerations, those who study treatment of cigarette smoking are in a position to obtain more rapidly research results that could suggest promising directions to be taken by those working with other types of substance abusers. However, as noted above, translation of strategies across drugs may involve substantial modifications, and separate demonstration of treatment efficacy of a given approach across drugs is needed.

DISCRIMINATING AMONG SUBSTANCE ABUSERS FOR PATIENT/PROGRAM MATCHING

It is a truism that substance abusers are a heterogeneous group, and this is certainly true about their ability to avoid relapse, as a significant minority appear to succeed with any given treatment effort. To increase the efficiency of treatment efforts, there has been an upsurge of interest in defining subgroups of patients who are likely to derive the greatest benefit from the different types of treatments available. To provide an empirical basis for this patient/program matching, investigators have long attempted to discover patient characteristics that are associated with treatment success and failure in substance abusers (Luborsky and McLellan 1978; Maddux and Desmond 1981; McLellan 1983; Ogborne 1978; Szapocznik and Ladner 1977; Vaillant 1983). The most commonly assessed predictors of outcome include clients' demographic characteristics, drug use history, and/or legal history. Reviews of the many such studies which have been completed suggest that the help they provide to clinicians in matching patients to programs is limited. Two trends characterize the results. First, most studies tend to show the "rich get richer" phenomenon, with those clients with the least severe symptoms or problems and the greatest social or psychological assets tend to have the best prognosis. Second, the amount of variance accounted for by patient predictors is generally modest, with any given predictor seldom accounting for more than 5 to 10 percent of the variance in outcome.

The lack of clinical utility of most predictor studies is based on several factors. First, many predictors which are studied have comparatively static traits or characteristics. In general, the safest assumption in predicting the way clients will perform is to assume that they will continue to do as they have in the past. This general pattern was found in the study described by Dr. Taylor and colleagues (this volume). However, the very thing which one is trying to predict in treatment is change from current behavior, and measurement of past traits is not necessarily a likely strategy for defining the propensity to change. Second, many of the characteristics which have been evaluated as predictors are not readily translatable to treatment strategies due to the static nature of the predictors studied. For example, determining that black males with a long criminal history have a poor prognosis does not suggest any particular clinical response except, perhaps, to fret more over this group.

Several directions in prognostic research show promise toward yielding findings which will be of greater utility to clinicians. First, the assessment of engagement in treatment has the advantage of measuring the beginning of the change process rather than some static trait that characterized past behavior. In the general field of psychotherapy research, this concept has been captured in research on the therapeutic alliance (Hartley 1985) which has yielded exciting and comparatively powerful results. In the substance abuse field, findings in smoking programs suggest that clients at the end of treatment are strongly able to predict their own ability to maintain abstinence (Bigelow, Brandon, Hall, this volume). This finding is consistent with the general concept that the clients' engagement in treatment or assessment of its success is a comparatively powerful index of the change process. A second promising area is the assessment of psychopathology. Using a global measure of severity of psychiatric problems, McLellan and associates have demonstrated that this variable is both strongly associated with success in treatment of alcoholics and other substance abusers and that it is useful as a guide to patient/program matching, as those with comparatively high severity are most likely to benefit from professional psychotherapy (McLellan et al., in press; Woody et al. 1984). Thus, this type of assessment has the advantage of being associated with a treatment strategy designed to address the problem. Similarly, depression, which has been shown to be responsive to psychological and pharmacological treatments, has also been shown to be common in substance abusers and related to poorer treatment outcome (Rounsaville et al. 1982a and b, 1985; Rounsaville et al., submitted). A third promising area for predictor studies is the assessment of the posttreatment environment. Characteristics of the posttreatment environment have been shown to be comparatively strongly related to relapse (Maddux and Desmond 1982; O'Donnell 1969; Vaillant 1973) and are more closely associated with treatment interventions, such as family therapy, that may be used to enhance the supportiveness of this environment.

THE NEED FOR RESEARCH ON SPECIFICITY OF RESULTS FROM DIFFERENT APPROACHES TO RELAPSE PREVENTION

In common with the literature on treatment approaches for other types of disorders, treatment of substance use disorders is characterized by a wide variety of techniques based, in part, on a bewilderingly diverse set of theoretical propositions. A crucial task for treatment research at this time is to determine the special properties of the different treatment approaches, either in the types of effects yielded or in the types of clients for which they are most effective (Parloff 1980). Because different types of treatment approaches involve different expenses, length of time required, and different professional credentials of the practitioners, evidence for differential efficacy across approaches is needed to justify the effort and expense involved in maintaining this diversity.

For those who espouse a particular approach to treating substance abusers, the crucial hypothesis to be ruled out is that effects of all treatment approaches are due to some nonspecific common elements, such as counteracting demoralization (Frank 1974; Klein and Rabkin 1984). In the general psychotherapy field, the evidence suggesting the importance of nonspecific elements is extensive. Reviews of the psychotherapy efficacy literature using meta-analysis have shown that psychotherapy is usually found to be effective in contrast with comparison conditions but that there is little evidence to date to suggest the greater efficacy of any given approach (Smith et al. 1980). In the field of substance abuse treatment, large-scale treatment followup studies such as those carried out by the Texas Christian University group have shown that, while the results of drug treatments are generally positive and related to being in treatment at least a minimum length of time, the treatment outcomes for those receiving such diverse programs as methadone maintenance, outpatient drug-free treatments, and therapeutic communities were not statistically distinguishable (Simpson and Sells 1982). In a more focused, carefully controlled clinical trial evaluating the efficacy of two very different forms of professional therapy as treatment of clients on methadone maintenance, Woody and colleagues (1983) found that the results of Supportive Expressive therapy (Luborsky 1984) and Cognitive Therapy (Beck et al. 1979) were not significantly different, although both were superior to the control condition.

Regarding the lack of specificity of effects from therapies based on different theories of substance abuse, or of other types of psychopathology, it should be noted that the empirical test of a theory-based therapy has no direct relationship to testing the hypotheses of the theory. Therapies are always simultaneously more and less than the theories on which they are based. All therapies include elements, such as the therapists' attempt to instill hope, that are not usually specified or seen as crucial to the theory underlying more specific techniques (Frank 1974; Klein and Rabkin 1984). In addition, most therapeutic maneuvers can be seen as working through different mechanisms using different theoretical conceptualizations of therapeutic change. For example, methadone maintenance is seen as a treatment approach based on Dole and Nyswander's substance-induced metabolic deficit theory (Dole 1967) while it could as readily be seen by a behavioral theorist as achieving its effect by blocking the positive reinforcement yielded through intravenous heroin use. In addition to containing elements which are not specified in the underlying theories, treatments never include maneuvers which are relevant to all of the propositions suggested by the theories. Because of these factors, evidence for the efficacy or lack of efficacy of a theory is not relevant to supporting or refuting it. A faulty theory can inspire an effective treatment as in the case of the development of lithium treatment for mania (Cade 1949) and a correct theory can be translated into an ineffective therapy. Hence, while the theories described in this volume may inspire treatment interventions, testing the efficacy of theory-based treatment is a separate process more directly relevant to clinical utility.

Determining the specific effects of a form of treatment is the second half of the equation in the attempt to maximize the efficiency of patient/program matching. The increased importance of research on patient/program matching is partially caused by financial pressures to maximize the cost effectiveness of treatments (Parloff 1982), but it is also related to advances in research methods to enable investigators to assess specific effects of different treatments more precisely. In the past 15 years, following the influential publication of guidelines suggested by Fiske et al. (1970), research on the efficacy of psychotherapy has developed a set of research standards which have allowed investigators to reduce the uncontrolled variability which may have undermined previous efforts to detect specific treatment effects (American Psychiatric Association Commission on Psychotherapy 1982, Williams and Spitzer 1984). These design features include the following: (a) use of credible control groups, which reduce the likelihood that treatment effects of the therapies being studied are due to nonspecific factors; (b) use of randomized treatment assignment, which reduces the likelihood that differences in outcomes across treatments are due to differences in the types of patients assigned to the treatments; (c) specified, homogenous patient groups, which allow for better matching of treatment groups, greater specificity in the treatment techniques utilized, and greater comparability in the measurement of treatment outcome across patients; (d) specified lengths and "dosages" of treatments, which have allowed comparability in the timing of outcome measurements and in the determination of the amount of treatment received; (e) improved methods for measuring outcome including use of reliable, standardized instruments; measurement of outcome by blind, independent raters; use of multiple outcome measures; use of multiple informants to measure outcome; and use of outcome measures which are designed to detect the theoretically specific effects of the different treatments being evaluated; (f) specification of the psychotherapeutic techniques being compared in training manuals, which reduce the variability in the delivery of treatments and reduce the overlap in the treatments being compared; (g) greater specification and reduced variability in the background of the therapists and of the specific training they have received to conduct the therapy being tested; and (h) monitoring of the therapies being contrasted to insure that the techniques are being practiced as described in training manuals and to detect commonalities and differences in the therapies being compared. While earlier psychotherapy efficacy studies have included many of these elements, the project which utilizes all of the above features for the first time is the NIMH Collaborative Study on the Treatment of Depression (Elkin et al. 1985). This study compares four treatments for ambulatory patients with Major Depression: (a) Cognitive Therapy (Beck et al. 1979); (b) Short Term Interpersonal Psychotherapy; (c) Imipramine and Clinical Management; and (d) Placebo and Clinical Management. This project breaks new ground in several ways, and the results, which are due to be announced by the middle of 1986, will be crucial for demonstrating the value of the methods listed above for detecting specificity of different treatments for depression. If the treatments in this study are shown to yield different types of results, this will suggest the value of similarly designed studies of different treatments with other clinical groups, such as substance abusers.

Carefully designed, controlled studies, with randomized assignment evaluating the efficacy of different approaches to treatment of substance abusers are comparatively rare (Desmond 1979; Rounsaville and Kleber 1985). Moreover, it should be noted that most of the major modalities for treating substance abusers today have not undergone efficacy testing of this sort. This includes such widespread treatment packages as methadone maintenance, therapeutic communities, and many outpatient drug-free approaches. Instead, these treatment approaches became more widespread following promising uncontrolled demonstration projects suggesting that the treatment had effects such as treatment retention, which were clearly superior to those reported for other approaches. Following the widespread use of these programs, followup studies have suggested their efficacy (De Leon 1984; McLellan et al. 1982; Simpson and Sells 1982). Although the research methods for evaluating efficacy of treatments have been available for many years, there are several factors in performing clinical trials with substance abusers which make this work difficult. First, the urgency of the treatment needs of most substance abusers makes them and their clinicians reluctant to participate in clinical trials, which include a theoretically inert placebo or non-intensive control condition. Hence, as long as an active, standard treatment is available as an alternative, recruitment is difficult. Second, related to the treatment urgency, it has been difficult in treatment studies with substance abusers to keep the treatment conditions distinct. In trials by Senay et al. (1973) and Bales et al. (1980), clients who were assigned to different treatments frequently obtained care in treatment conditions to which they were not originally assigned. Third, because of the often heated controversy generated by differences in treatment philosophy for proponents of different treatment approaches (Davis 1970), clinicians espousing one or another of the established approaches are often reluctant to allow clients to participate in studies which include alternative methods.

Despite the difficulties described above, progress in developing and testing improved methods for preventing relapse to substance abuse must take place through a rational series of well-designed clinical trials using the features described above. Once open trials and/or demonstration projects suggest the value of new approaches, studies of two general types are needed to demonstrate their unique properties. At one level, clinical trials are needed to suggest the efficacy of a new treatment "package" such as a behavioral relapse prevention approach (Marlatt and George 1984; Marlatt and Gordon 1980). At a second level, studies are needed which aim at identifying the active ingredients of a treatment package or conditions in which it is most effective. This can be accomplished by offering the same general treatment approach to different groups while varying a single crucial element such as time when the treatment is offered or provision of a specific method for handling situations of high relapse risk.

Several of the chapters in this volume suggest treatment comparisons which may be fruitful. First, in Dr. Hall's assessment of factors related to relapse to abuse of three substances, she found that subjects who simply predicted that they would not relapse were most likely to fulfill this prediction. This finding seems to contrast with the theory and treatment approach of Marlatt and colleagues (Marlatt and George 1984; Marlatt and Gordon 1980), which aims at helping the subject recognize that a temporary resumption of drug use is likely. Clients are encouraged to practice positive responses to this anticipated event. A systematic comparison of approaches which emphasize anticipation of relapse with those which simply rule out further use would be useful to determine if the specific relapse anticipation is valuable. Second, several of the chapters suggest that timing and duration of relapse prevention efforts are important elements. For Dr. Bigelow's study of a smoking prevention approach with myocardial infarction patients, beginning the program before the use of the first cigarette proved crucial (Bigelow et al., this volume). From the DARP and TOPS studies, the findings on relapse suggest that the time of greatest vulnerability is shortly after the cessation of treatment although vulnerability remains high throughout the first posttreatment year and never disappears even after 12 years (Hubbard, Simpson and Marsh). Regarding the efficacy of posttreatment relapse prevention approaches, an important issue is the maximally cost effective duration of posttreatment followup. If, for example, posttreatment followup efforts persist beyond the first 6 months, does this yield any detectable added improvement in relapse rates? Third, the longitudinal findings discussed by Drs. Maddux and Simpson (this volume) suggest the importance for relapse prevention of a supportive social environment following completion of treatment. Studies aimed at evaluating approaches for enhancing the social network of substance abusers after treatment may fruitfully compare such approaches as family psychotherapy, provision of drop-in groups or centers, or provision of specific assistance while in treatment in getting the client involved in self-help groups like Alcoholics Anonymous, that can continue, following discharge from treatment.

CURRENTLY PRACTICABLE RELAPSE PREVENTION STRATEGIES

While a central conclusion of this chapter is that more careful research is needed to develop and evaluate promising new strategies for reducing relapse to drug abuse, this will be a long-term process, while the treatment needs of substance abusers are immediate. The longitudinal findings presented in this volume indicate that a substantial number of substance abusers will relapse following treatment and much of this relapse will occur within the first year. A simplistic response to these findings would be to extend treatment by 1 year. This response is not likely to reduce relapse dramatically because many of those who relapse following treatment were already beginning to resume drug use at the end of their treatment and were not genuine program completers. Other problems with simply extending the length of treatment include the added expense (especially for those who need no further treatment) and the fact that attrition by those with a high probability of relapse will take place even while they are offered continuous treatment. Unless continuous treatment is to be considered a lifelong answer for substance abusers, they need to be prepared to manage without it. Five steps could be considered by programs at this time suggested by findings presented in this volume. This list of strategies is not intended to be exhaustive and a review of aftercare approaches is provided by Hawkins and Catalano (in press).

A first, basic step in preventing relapse is making a recognition of its likelihood a focus of the treatment program. At minimum this should involve explicit policies regarding reentry into treatment when relapse occurs. Preferably, the procedures for reentering treatment following a brief relapse should be facilitated so that the client is encouraged to seek help early and before resumption of substance abuse has become entrenched. These could include encouraging clients to telephone their counselors if a slip occurs even if they are no longer on the treatment program.

A second step which is likely to reduce relapse would be the inclusion of interventions in treatment specifically designed to anticipate relapse. This could include the kind of training for constructive responses described by Marlatt (1980, 1984) and it could usefully include family members who could be trained to recognize early signs of relapse and encouraged to place pressure on the relapsing family member to re-enter treatment.

A third step would take the strategy of using the time in treatment to enhance the supportiveness of the posttreatment environment. One relatively simple and inexpensive intervention of this type would be to make efforts to encourage clients to become engaged in self-help groups while they are also in treatment. Counselors could accompany clients to self-help group meetings and make explanatory literature available. Fellow clients who are farther along in treatment could be encouraged to accompany new clients to self-help group meetings. Spouses and family members of clients could be encouraged to get involved in self-help spouse groups, such as Al Anon. A more staff-intensive intervention would be to involve families or significant others of all clients in treatment and to engage these members of the social network in relapse prevention strategies as well as traditional family therapy.

A fourth step would be to develop aftercare programs which offer continued contact with the client but at a much less intensive level than regular treatment. Because the majority of relapse will occur during the first year following treatment, this length of time would probably be optimal for these kinds of efforts. Aftercare programs could take the form of monthly telephone calls by counselors to check up on how the client is progressing; regular therapy meetings, but on a much less frequent basis; or "drop-in" groups which meet weekly at a specific time and which are open to any former clients who wish to attend. Such aftercare efforts would necessarily involve considerable additional staff time and this would need to be taken into account in fees collected from clients or funding agencies while the clients are in the full treatment program.

A final step would be to make interventions while in treatment that take into account the likelihood of drug substitution as a form of relapse. Segregation of treatment programs for abusers of different drugs is the most common strategy, and this may ignore drug abuse that is not seen by the client as primary but which may increase in importance when the major type of drug abuse is curtailed, as shown in Dr. Hubbard's chapter (this volume). Addressing additional drugs of abuse could take the form of engaging the client in multiple treatment programs or forming subcomponents within a treatment program, such as an alcoholics' group that is run within a methadone maintenance program.

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ACKNOWLEDGMENT

Support for this work was provided by a Research Career Scientist Development Award #K02 DA00089-01 from the National Institute of Drug Abuse.

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Relapse and Recovery: Some Directions for Research and Practice

Carl G. Leukefeld and Frank M. Tims

The addictions treatment field is maturing. Studies can now be cited which indicate that drug abuse treatments are effective and produce desired behavioral change (Tims 1981). But these studies also point to a high rate of relapse. Indeed, they tend to support the concept of addiction as a "chronic relapsing disease." Growing out of these studies are other findings showing that differential prognoses appear to be a function of such variables as time in treatment, commitment to seek change, and associated kinds (and severity) of psychopathology. There are also abundant data showing that drug abusers commonly experience multiple treatments. Given these and related findings, a major problem confronting treatment is the bringing about and maintenance of positive behavioral change--preventing relapse. As is pointed out in several chapters of this volume (e.g., Hubbard and Marsden; Taylor et al.), consideration of relapse from either theoretical or clinical practice perspectives encounters both philosophical and theoretical dilemmas. What is the clinical significance of reverting to "controlled" use or a shift to a substance not thought to be as pernicious as the one(s) for which treatment was provided? At what point is relapse considered to have occurred?

There has been more limited exploration of recovery. Recovery is a desired end in which drug abuse and related behavior are no longer problematic in the individual's life. In the Alcoholics Anonymous model, an alcoholic never actually recovers, and is always at risk for relapse. The debate over who recovers is a continuing one. The few studies of untreated or "natural" recoveries (e.g., Waldorf 1983) suffer from major limitations, notably, unknown sampling bias, and consequently, non-generalizability to the untreated drug abuser. Some recent research indicates that a significant percentage of treated addicts have relatively short addiction careers (Simpson and Marsh, this volume). A major issue is the definition of recovery. Some researchers and clinicians define recovery as total abstinence, whereas others accept some limited substance use. A similar question may be posed with regard to the definition of relapse. Rigid criteria may be problematic to both researcher and clinician, while a more permissive standard is fraught with clinical risk (i.e., that permitted use of a less pernicious drug may undermine the client's commitment to abstinence in any of several ways -- such as triggering craving for other drugs; lapses in self-control, and violation of an abstinence norm). A single use of a given substance may be the first step to loss of control, simply a slip from the path of recovery, or it may have another, more specialized meaning of relapse (e.g., Duckitt et al. 1985; Marlatt and George 1984).

This volume does not resolve the specific definitional questions relating to relapse and recovery, but rather explores issues and approaches to conceptual refinement, research directions, and pragmatic questions for clinicians in these areas. The principal thrust of the meeting on which this monograph is based considered opiates, alcohol, and tobacco as the three substances across which commonalities in relapse to use and recovery from dependence might be usefully studied. Indeed, examination of the arguments for the utility of this approach (National Academy of Sciences 1981) suggested that it might yield valuable insights, and this has been our experience. From practice, as well as from the observations of researchers (see Hubbard and Marsden, this volume), it is evident that multiple, chronic dependence is not unusual. This has been a dilemma for methadone programs which give attention to heroin addiction in a treatment population where alcoholism, smoking, and abuse of other drugs is widespread. Should treatment be directed toward one drug while ignoring others, or should the clinic staff make demands on the client that other problematic substances, some of which may be legal (e.g., alcohol, tobacco), also be given up? This sort of question has numerous implications for both treatment research and practice.

Before presenting the following specific recommendations for practice and research, it is important to indicate that there was a high degree of agreement, based on discussions regarding both research and practice considerations, by the participants. In fact, general merging toward total consensus might be a more appropriate description. The extent of that consensus was unexpected. Clearly, the following recommendations for research and practice will overlap, and the separation here into three sections focused on theory, research, and practice, is not intended to detract from, but to enhance conceptual clarity. We hope this volume focuses additional attention on relapse and recovery. Alcoholics Anonymous, Narcotics Anonymous, and other groups which have been labeled as self-help groups, have provided the supports necessary for sustaining the recovering person. However, there are clear definitional discrepancies regarding relapse when studies are reviewed, including those in this volume.

Relapse and recovery have been defined in many ways. There was not an attempt made here to standardize the definition of relapse or recovery. Rather, these concepts are viewed as related phenomena which are important for our better understanding of addiction and practice interventions.

CONSIDERATIONS FOR THEORY: THEMES TO APPROACH THEORY AND THEORY DEVELOPMENT

Numerous theoretical positions have been taken to explain relapse. Yet, a coherent, integrated theory is lacking. Discussion related to theory and theory development acknowledged the importance of theory as a guide to research and practice, but the lack of explanatory power in existing theory, and the lack of theoretical organization, was repeatedly cited as cause for concern. For example, it was noted that Lettieri et al. (1980) have identified over 43 theories to explain drug abuse.

That aside, an overall theory as suggested by Edwards et al. (1981), which combines cognitive, physiological, and behavioral components, is important for developing a broad conceptualization of relapse and recovery. In addition, a theory of relapse and recovery should explain a variety of related phenomena. Specific criteria need to be explicated so that they can be used to evaluate theory--proven or disproven. Clearly, theories must be judged on specific criteria which include utility and their ability to direct research in a meaningful, parsimonious fashion. Moreover, theories should help generate principles and techniques for clinical practice, and should benefit from insight derived from practice. Such interplay between theoretical formulation and clinical experience is generally lacking.

A related question to consider when alcohol, tobacco, and drugs are taken into account is the specificity of the behavioral disorder. Current research and practice trends are focusing on specificity and individual drugs, rather than the suggested focus on examining relapse from a more general perspective.

IMPLICATIONS FOR RELAPSE AND RECOVERY RESEARCH

Overall, a great deal needs to be done in this area of research. There are research opportunities which can lead to better understanding of relapse and recovery. Specific discussion focused on two broad areas: (1) Design issues related to planning relapse and recovery studies, and (2) research implementation strategies. As a beginning point and a carryover from discussions related to theory, research definitions should relate to theory. It was suggested that cognitive behavioral theories may have particular utility for relapse and recovery. Ideally, it would be appropriate to design prospective studies which examine relapse and recovery, although use of available study populations may make it necessary to approach studies retrospectively. It was suggested that existing data bases such as TOPS and DARP might serve as a beginning to examine relapse and recovery within retrospective analyses. Five general types of studies were suggested to more closely examine relapse and recovery:

1. Longitudinal studies which clarify the natural history of addiction careers. Such studies would be designed to allow researchers to examine more closely relapse and recovery.

2. Descriptive studies to pinpoint who relapses. These studies would provide a clearer understanding of sex, age, and drug type variables as these variables impact on relapse. Similarly, studies of individuals in recovery might provide a clearer picture and description of recovery processes.

3. Laboratory studies to examine physiological factors. Such studies would provide further insight into the nature of factors related to the clinical aspects of relapse and recovery. Limited information is currently available regarding the physiological aspects of those recovering.

4. Experimental studies to assess behavioral aspects of relapse, particularly the role of environmental stimuli, including both treatment and non-treatment factors. Such studies should enable understanding of the role of treatment as well as other variables in relapse processes for well-defined subgroups of clients.

5. Clinical studies which would clarify the role of psychopathology as a risk factor in relapse. This would extend already existing findings on psychopathology as a prognostic variable, and specify how subgroups of clients respond to treatment and to the other stimuli present in the natural environment, as well as how changes in psychopathology moderate risk of relapse. In this connection, it is important to assess clients on a continuing basis at intake, during treatment, and during the posttreatment period. Such studies might also address familial characteristics, as well as individual psychopathology, as predisposing factors.

It was also suggested that treatment evaluations be designed to incorporate relapse and recovery as an a priori focus. Such treatment evaluations should include: (1) theoretical and operational definitions of relapse and recovery, (2) credible control group(s), (3) random assignment of groups to treatments, (4) well-defined patiant groups, (5) standardized treatments which are adequately described in manuals, (6) specified treatment lengths and treatment doses as well as assurance that interventions are delivered, (7) use of consistent, reliable and valid outcome measures, and (8) specific therapist characteristics and training. The second broad area of discussion focused on research implementation strategies which address specific problems. Focus shifted to specific areas and problems which might have high payoff or should receive specific attention for the study of relapse and recovery. The major impression gained from this discussion was the limited amount of information available on recovery. In the drug abuse area, self-help groups based upon research findings are being initiated as aftercare services (see McAuliffe, this volume) to prevent relapse and enhance client recovery.

IMPLICATIONS FOR PRACTICE: RELAPSE AND RECOVERY

The overriding implication for practitioners, based on discussion from this review, is that factors associated with relapse need to be explicitly identified and become part of the treatment process. That emphasis could decrease relapse and enhance recovery. A better understanding of patient motivation and decision-making should also be a significant part of treatment. Likewise, understanding the timing of interventions could make an important contribution to recovery.

Since a number of individuals start using substances immediately following their departure from treatment, treatment could be designed so that patients do not drift away from treatment facilities. Formal procedures for discharging patients with specified treatment protocols could go a long way toward decreasing patient drift. Treatment contracts with individual patients might form the foundation of reducing relapse.

The practitioner's role involves not only bringing about positive behavioral change and cessation of drug use, but also maintaining that change and preventing relapse. The development of a better understanding on the part of practitioners and clients regarding the risk of relapse, and the desirability of maintaining the gains they have made, are important. Equally important is the understanding of the relapse process itself so that appropriate strategies and support systems may be devised and implemented. This approach calls for skill development in self-regulation on the part of the client while recognizing indications of increasing risk. Thus, clinicians must explicitly deal with relapse as part of the treatment process and treatment protocol. Perhaps the most powerful determinant of relapse is the individual's (lack of) commitment to abstinence. Careful consideration should be given to formulating strategies for helping the client develop such a commitment to abstinence. At the most basic level, commitment to change should be incorporated into the treatment process from the outset. It seems that identified and individualized factors associated with relapse could also be incorporated with treatment to decrease relapse. Practitioners must also realistically deal with limited motivation or commitment by individuals to engage in the treatment process. It was suggested that this emphasis might also become part of treatment at the outset. Many users have a low tolerance for stress and find it easy to return to use rather than deal with stressors. Based on these discussions, the ability to cope with distress was identified as an important component of Alcoholics Anonymous and other self-help models.

Based upon information currently available, the first three months of treatment are probably the most critical for relapse, as is the first year of treatment. With this in mind, clinicians should make aftercare contacts at the:

- first week after treatment
- first month after treatment
- third month after treatment
- first year after treatment

It was suggested that individualized contact would be most effective and that telephone contact would be acceptable, although outreach/aftercare workers might be a more effective approach.

Given the constraints on available resources, insight therapy should be limited. Rather, encouragement, support, containment, and direct intervention, as well as confrontation, should be used in clinical settings. In fact, there may be need for external treatment controls or coercive approaches for alcohol and drug abusers to decrease relapse rates. Such approaches as Bigelow's crisis intervention model (this volume) which was developed with nicotine dependent, myocardial infarction patients, may be quite useful in developing strategies for reducing drug use and examining relapse. While Bigelow's study dealt with a specialized treatment population, it underscores the utility of exploring critical life events and concerns of clients, and making timely interventions to crystallize whatever potential commitment to abstinence may be present.

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U.S. GOVERNMENT PRINTING OFFICE: 1988—221-846/90177

DHHS Publication No. (ADM)88-1473
Alcohol, Drug Abuse, and Mental Health Administration
Printed 1986 Reprinted 1988